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URBANA

REPORT OF INVESTIGATIONS — NO. 87

ILLINOIS MINERAL INDUSTRY IN 1941

BY

WALTER H. VOSKUIL, DOUGLAS F. STEVENS, AND G. N. OLIVER

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Topographic Mapping in Cooperation with the United States Geological Survey.
This Report is a Contribution of the Mineral Economics Section.

May 1, 1943

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BY

WALTER H. VOSKUIL, DOUGLAS F. STEVENS, AND G. N. OLIVER

INTRODUCTION

ILLINOIS MINERAL INDUSTRY in 1941 exceeded all previous years except 1920 in value of output with a total mineral production of $336,490,000 mined and sold or used by producers within the State, and the additional value of $164,217,000 for mineral materials processed, but not mined, in Illinois. These made a total of $500,707,000 for minerals produced and processed during 1941, which was an increase of $94,000,000, or 23 per cent over that for 1940, and an increase of $199,000,000, or 66 per cent over that for 1939.

During 1920, which for Illinois minerals was the peak year of activity following the first World War, the State's mineral production reached the value of $373,926,000, and the value of $137,228,000 for mineral materials processed, but not mined, in Illinois. These made a total of $511,154,000, or only 2 per cent above the total for 1941. Considering that in 1920 the value of coal produced was $273,509,000, while in 1941 the value of coal production was $100,212,000, the diversity and extent of mineral production and processing shown during 1941 is very significant.

The minerals and mineral materials which made the largest increase in value during 1941 were pig iron, which increased $40,000,000 over the value for 1940; petroleum, which increased $17,000,000; coal, which increased $14,000,000; coke, which increased $7,000,000; stone, including cement and lime, which increased $5,000,000; and slab zinc, which increased $5,000,000.

All of these increases in mineral production and processing during 1941 were due directly or indirectly to the tremendous program of military preparations carried on by the United States at a constantly increasing rate throughout the year. The second World War began to affect the mineral industry of Illinois during 1940 by the stimulation of demand from industries directly connected with filling orders for military equipment for this country and for foreign countries. This stimulation continued and increased throughout 1941 from the rapidly increasing military preparations of the United States and the great program of aiding its allies, which culminated in the United States entering the war in December, 1941.

Compared with other states, Illinois ranked first in value of production for 1941 of fluorspar, ground silica, and tripoli (amorphous silica); third in value of coal, limestone and dolomite, and slab zinc; fourth in value of petroleum, pig iron, structural clay products, and fuller's earth; and fifth in value of sand and gravel, coke and byproducts, and lime. In total value of mineral production for 1940, Illinois ranked fifth, compared with its rank of sixth for the previous year. State ranking for 1941 is not yet available.

Comparing the value of various minerals mined and sold or used by producers in Illinois in 1941, petroleum ranked first with a value of $179,533,000 (an all-time record for value); coal ranked second with a value of $100,212,000;

TABLE 1—SUMMARY OF MINERAL SOLD OR USED BY PRODUCERS,

Product	Unit	Detail Table	1939 Quantity	1939 Value	1939 Aver.	Rank among States: Quant.	Rank among States: Value
Petroleum—							
Crude oil	bbls.	22	94,912,000	$101,200,000	$1.07	4	4
Natural gas	M. cu. ft.	"	7,062,338	225,200	.032		
Natural gasoline	gals.	"	4,012,000	228,900	.057		
Liquefied petroleum gases	"	"	—	—	—		
			—	101,654,100			
Coal—bituminous	tons	7	47,627,000	78,108,000	1.64	3	3
Stone—							
Limestone and dolomite	tons	31	8,369,202	7,696,628	.92	4	3
Cement	bbls.	36	4,897,961	7,226,344	1.48	7	9
Lime	tons	"	147,729	1,064,154	7.23	8	5
			—	15,987,126			
Clay and clay products—							
Clays (except fuller's earth)	tons	40	129,483	273,387	2.12	6	7
Fuller's earth	"	"	28,248	218,553	7.74	4	4
Clay products—structural	equiv. tons	"	1,161,071	6,719,811	5.79		4
White wares and pottery	—	"	—	2,037,447	—		
Refractory products	tons	"	140,717	2,328,107	16.50		
			—	11,577,305			
Sand and gravel—							
Silica sand	tons	37	1,120,641	1,518,681	1.35		
Sand (other than silica sand)	"	"	2,926,675	1,162,008	.40		
Gravel	"	"	5,720,973	2,426,755	.42		
			9,768,289	5,107,444	.52	5	6
Fluorspar	tons	42	75,257	1,638,693	21.77	2	2
Metals—							
Zinc	tons	48	334	34,736	104.00		
Lead	"	"	308	28,952	94.00		
Silver	fine ounces	"	675	458	0.68		
			—	64,146			
Ground silica	tons	38	87,406	538,282	6.17	1	2
Tripoli (amorphous silica)	"	39	11,134	148,310	13.32	2	2
Other minerals	"	49	278,764	354,862	—		
Annual mineral production			—	$215,178,268			6
Minerals Processed, but not Mined, in Illinois[b]							
Coke and byproducts	—	50	—	18,728,845	—	7	6
Packaged fuel	tons	"	3,998	40,487	10.10	6	6
Pig iron	"	"	3,203,846	57,718,814	18.02	4	4
Sulfuric acid	"	"	178,144	1,605,077	9.00	2	2
Slab zinc (out of state ore)	"	"	79,146	8,231,184	104.00	4	4
			—	86,324,407	—		
Total minerals produced and processed			—	$301,502,675	—		

[a] Compiled from various sources, as stated in each detailed table. See footnotes for each table.
[b] Other processed minerals produced in Illinois include alumina, phosphates, etc., but data for them are not available.

PRODUCTION OF ILLINOIS
1939, 1940, AND 1941[a]

1940					1941				
Quantity	Value	Aver.	Rank among States		Quantity	Value	Aver.	Rank among States	
			Quant.	Value				Quant.	Value
147,647,000	$160,900,000	$1.09	4	4	134,138,000	$174,380,000	$1.30	4	4
9,350,328	252,500	.027			11,759,400	352,800	.03		
21,432,000	1,122,000	.052			93,165,000	3,747,000	.04		
—	—	—			38,293,000	1,054,000	.028		
—	162,274,500				—	179,533,800			
51,283,000	86,667,000	1.69	3	4	55,365,835	100,212,000	1.81	3	3
9,487,369	7,751,479	.82	4	4	12,206,136	11,104,104	.91	4	3
5,006,727	7,347,253	1.47	8	10	6,033,440	8,799,667	1.46	9	9
161,358	1,150,113	7.15	8	6	246,278	1,723,850	7.02	6	5
—	16,248,845				—	21,627,621			
160,666	340,376	2.12	6	7	222,405	490,525	2.20	6	7
24,974	205,494	8.24	4	4	26,676	209,577	7.87	4	4
1,272,654	7,051,300	5.55		4	1,556,420	8,248,514	5.32		4
—	4,965,374	—			—	6,555,472	—		
198,343	3,872,045	19.50			244,352	4,791,299	19.61		
—	16,434,589				—	20,295,387			
1,396,087	1,811,363	1.30			2,092,700	2,872,961	1.37		
3,518,135	1,450,400	.41			5,038,032	2,249,091	.45		
5,839,226	2,576,362	.44			8,230,247	3,764,944	.46		
10,753,448	5,838,125	.54	4	5	15,360,979	8,886,996	.58	3	5
104,698	2,313,747	22.10	1	1	133,333	3,047,247	22.85	2	1
4,818	607,068	126.00			9,198	1,379,700	150.00		
1,508	150,800	100.00			2,376	270,864	114.00		
4,766	3,389	0.71			20,340	14,464	0.71		
—	761,257				—	1,665,028			
106,397	628,488	5.88	1	1	139,116	849,609	6.10	1	1
11,521	155,576	13.45	2	1	13,833	200,700	14.45	1	1
279,724	242,526	—			137,053	171,177	—		
—	$291,564,653			5	—	$336,489,565			
—	26,951,464		6	5	—	33,654,940		6	5
3,813	36,531	9.60	7	7	8,924	95,431	10.60	7	7
4,093,623	73,882,065	18.05	4	4	5,461,459	113,558,606	20.79	4	4
188,355	1,721,565	9.15	2	2	—	—			
97,001	12,222,126	126.00	3	3	112,723	16,908,450	150.00	3	3
—	114,813,751				—	164,217,427			
—	$406,378,404				—	$500,706,992			

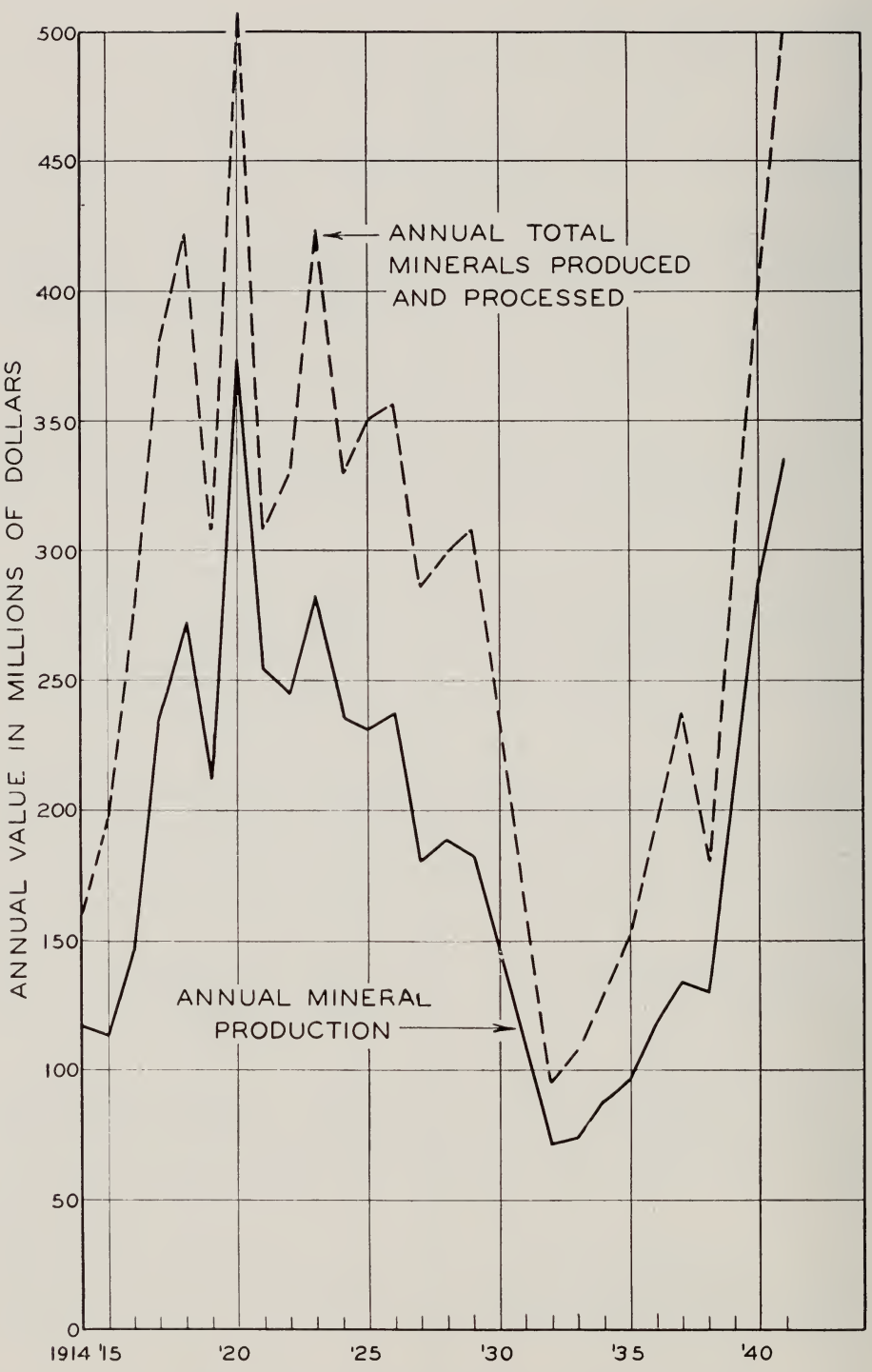

FIG. 1.—Value of annual mineral production of Illinois, 1914-1941.

stone, including limestone and dolomite, cement and lime, ranked third with a value of $21,627,000 (an all-time record for limestone and dolomite); clay and clay products, including silica refractories and fuller's earth, ranked fourth with a value of $20,295,000; and sand and gravel, including silica sand, ranked fifth with a value of $8,887,000.

Considering mineral materials processed, but not mined, in Illinois, pig iron ranked first with a value of $113,558,000 (an all-time record); coke and by-products ranked second with a value of $33,654,000 (another all-time record); and slab zinc, smelted from out-of-state ore, ranked third with a value of $16,908,000. Other processed mineral materials produced in Illinois in large amounts include alumina, phosphates, etc., but data for them are not available.

Acknowledgments

This report is made possible through the cooperation of the Bureau of Mines and the Bituminous Coal Division of the United States Department of the Interior, the Illinois State Department of Mines and Minerals, and the cooperation of mineral producers throughout Illinois in furnishing information regarding their operations. Two officials of the United States Bureau of Mines have been of special assistance in the preparation of this report: E. W. Pehrson, Chief, Economics and Statistics Service, Washington, D. C.; and O. M. Bishop, District Engineer, Urbana, Illinois.

Each of the sections of this report was prepared under the supervision of the head of the division of the Illinois State Geological Survey which has charge of that mineral material. Special recognition should be made of the extensive and invaluable assistance of J. E. Lamar, Geologist and Head of the Industrial Minerals Division; and the counsel and assistance of G. H. Cady, Senior Geologist and Head of the Coal Division, who contributed the special article on "Potential Illinois Coal Production During War Years" (see page 20); A. H. Bell, Geologist and Head of the Oil and Gas Division, and C. W. Carter, Assistant Geologist of that Division; Ralph E. Grim, Petrographer; and R. J. Piersol, Physicist.

PRODUCTION AND VALUE OF ILLINOIS MINERALS IN 1941

A summary of the production and value of Illinois minerals in 1941 is presented in table 1, with comparative data for 1939 and 1940. Detailed figures for each mineral are given in the various sections of this report, to which reference is made in table 1.

The unit of quantity measurement used for each mineral product in this report is that commonly used in the commercial handling of that material. Wherever possible the net or short ton of 2000 pounds is used, but some products are sold by the gallon, barrel, cubic foot, or by the number of pieces. In some materials, diversity of products makes it impossible to give any measure of quantity.

The value of each mineral product, in its first marketable form, is given as its net selling price at point of origin, without including any transportation expense other than that necessary in bringing it from the mine to the place where it is made into a marketable product. Wherever possible, average or unit rates of value are given. The quantity and value of metals are given, not as those of the ores, but in terms of the recovered metals.

Mineral production is considered as those minerals or mineral materials which were mined and sold or used by producers in Illinois. Mineral materials which were processed, but not mined, in Illinois are shown separately. Every effort has been made to avoid duplication.

TABLE 2—VALUE OF ILLINOIS MINERAL PRODUCTION
SUMMARY OF ANNUAL VALUES, 1914–1941[a]
(In thousands of dollars)

Year	Mineral Production of Illinois (thousands)	Minerals Processed, but not Mined, in Illinois (thousands)	Total Minerals Produced and Processed (thousands)
1914	$117,166	$44,843	$162,009
15	114,446	82,871	197,317
16	146,360	130,082	276,442
17	234,736	144,754	379,490
18	271,244	149,740	420,984
19	213,701	95,077	308,778
1920	373,926	137,228	511,154
21	254,019	54,136	308,155
22	244,618	85,820	330,438
23	282,761	142,131	424,892
24	235,796	95,506	331,302
1925	231,658	118,702	350,360
26	237,242	119,642	356,884
27	180,394	105,099	285,493
28	188,099	110,622	298,721
29	182,791	125,516	308,307
1930	148,311	89,303	237,614
31	108,066	52,014	160,080
32	71,693	24,385	96,078
33	74,837	34,786	109,623
34	89,212	41,405	130,617
1935	96,484	57,038	153,522
36	117,916	78,693	196,609
37	133,437	104,359	237,796
38	130,155	50,482	180,637
39	215,178	86,324	301,502
1940	291,564	114,814	406,378
41	336,490	164,217	500,707

[a] Compiled from U. S. Geol. Survey, Mineral Resources of U. S.—1914 to 1922, incl.
U. S. Bur. Mines, Mineral Resources of U. S.—1923 to 1931, incl.
U. S. Bur. Mines, Minerals Yearbooks—1932 to 1938, incl.
Minerals Yearbooks and joint canvasses made by U. S. Bur. Mines and Illinois Geol. Survey—1939 to 1941, incl.

Several changes in methods of presentation and classification of data have been introduced into this report, giving more detailed information on a larger number of individual products than in previous reports. Additional sections are given dealing with natural gasoline and liquefied petroleum gases; limestone and dolomite; sand and gravel (including silica sand); ground silica; tripoli (amorphous silica); other minerals; and minerals processed, but not mined, in Illinois. The section dealing with clay and clay products (including silica refractories and fuller's earth) has been enlarged and made more detailed and comprehensive. Graphs have been introduced wherever they give added clearness to the data and comparison over a period of years. Certain errors which inadvertently crept into reports on mineral production in 1939 and 1940 have been corrected in the current report, and the data given herein therefore supersede those of the previous reports.

Illinois has attained a position of importance among the various states in the production of several mineral materials. Its rank both in quantity and value of these materials is given in table 1.

In order to permit comparison of mineral production in 1939, 1940 and 1941 with that in previous years, fig. 1 and table 2 are presented, which show the value of annual mineral production of Illinois from 1914 to 1941, inclusive. These indicate the effect on the State's mineral industry of the first World War and the period of great industrial activity which followed, through 1923. Then a period of gradual reduction through 1929, was followed by extreme reduction through the depression years, and then gradual increases through 1937. A temporary decline in 1938 preceded the great period of activity caused by the second World War beginning in 1939.

COAL

Coal is the second mineral product in Illinois in value. The 1941 production amounted to 55,366,000 tons, valued at approximately $100,212,000. Illinois ranks third in the United States in quantity of bituminous coal produced, being surpassed only by West Virginia and Pennsylvania. Illinois produced 10.8 per cent of the total for the nation.

Production

The production of bituminous coal in each state for 1937 to 1941, inclusive, is shown in table 3. During each of the past four years a progressive increase in production has occurred in the nation as a whole, and also in Illinois. Table 4 gives this comparison between Illinois and the nation, and with two groups of adjacent states, (a) Indiana and Western Kentucky, and (b) Arkansas, Iowa, Missouri, Kansas, and Oklahoma. Illinois production in 1941 showed an increase of 8 per cent over that for 1940, while that for the United States as a whole increased 11 per cent.

Illinois coal production for 1941 is shown in table 5 by types of mines, giving the counties and mine-inspection districts. Local mines are those which do not ship by rail. The regional concentration of the coal industry in Illinois is shown in this table. Franklin County, in the southern part of the State, and Christian County, in the central part, showed the largest production. A county location map is given in figure 2.

Seasonal variation in demand for bituminous coal, as reflected in the production by months during 1941 in Illinois and in the United States, is shown in table 6, giving the percentage of Illinois production to that of the nation. Cessation of production pending the negotiation of a new contract between operators and miners reduced output in April, 1941. The seasonal variation in Illinois, compared with that of the nation, was slightly less than that for the previous year.

The amount of coal produced and its value at the mines is shown in table 7, for each year since 1920, by types of mines. For comparison, the 20-year average for the period 1920-1939, inclusive, is given. The past three years show gradual improvement both in quantity and average value, but the latter is still far below the 20-year average.

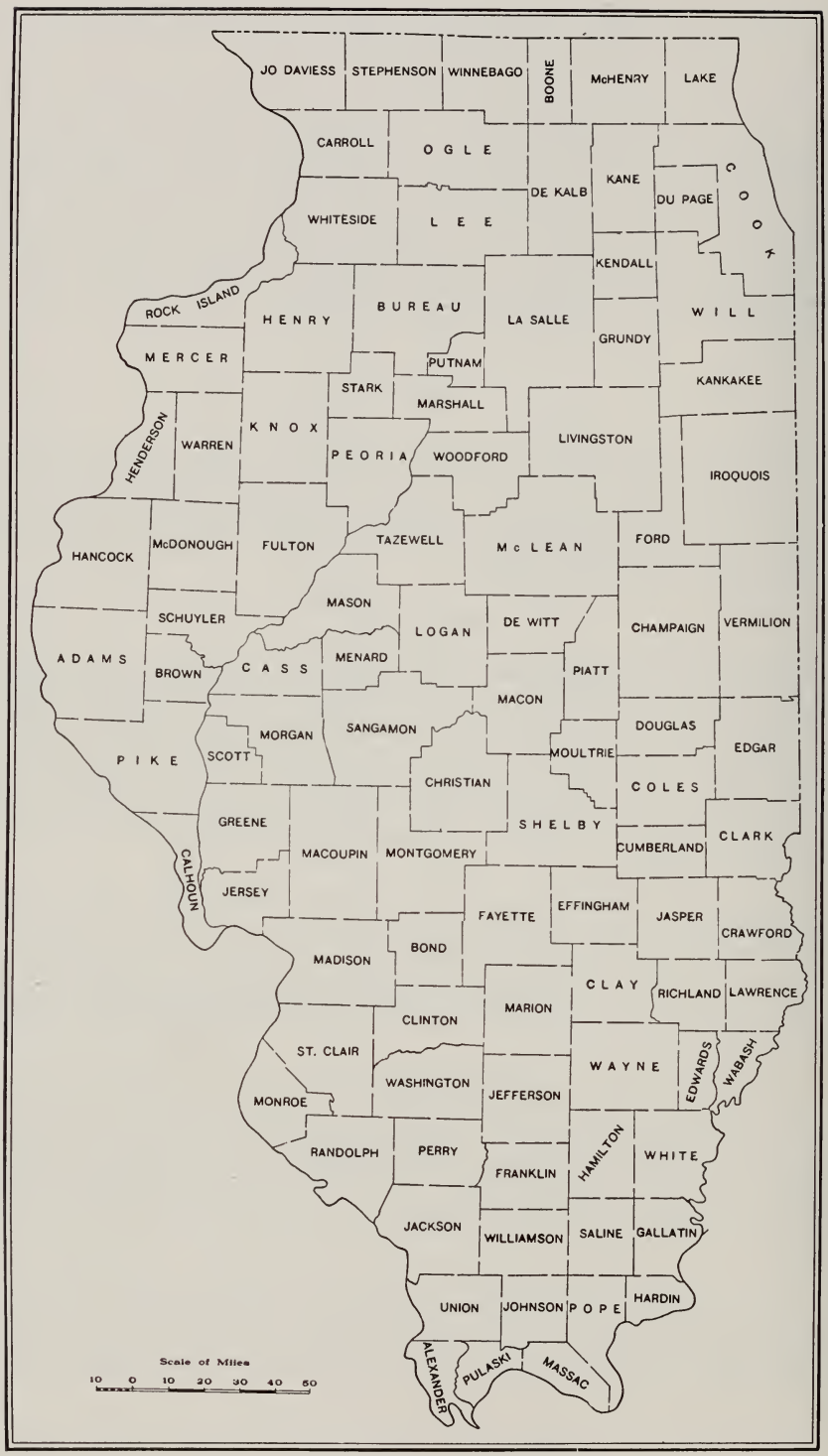

FIG. 2.—County location map of Illinois.

TABLE 3.—BITUMINOUS COAL PRODUCTION IN THE UNITED STATES, BY STATES, 1937–1941[a, b]
(In thousands of net tons)

State	1937	1938	1939	1940	1941
Alabama	12,440	11,062	12,047	15,324	15,204
Alaska	132	155	148	174	241
Arkansas and Oklahoma	3,111	2,442	2,340	3,100	3,423
Colorado	7,187	5,663	5,923	6,589	6,905
Georgia and North Carolina	(c)	(c)	(c)	42	40
Illinois	52,432	42,387	47,627	51,283	55,366
Indiana	17,765	14,758	16,943	18,869	22,590
Iowa	3,637	3,103	2,948	3,231	2,950
Kansas and Missouri	6,984	6,090	5,948	6,676	7,445
Kentucky:					
Eastern	38,524	31,177	34,266	40,346	41,510
Western	8,563	7,368	8,291	8,795	11,765
Maryland	1,549	1,281	1,443	1,503	1,748
Michigan	562	495	457	410	370
Montana	2,965	2,732	2,804	2,867	3,200
New Mexico	1,715	1,239	1,230	1,111	1,250
North and South Dakota	2,298	2,098	2,120	2,284	2,426
Ohio	25,178	18,591	20,289	22,772	29,690
Pennsylvania (bituminous)	111,002	77,705	92,584	116,603	127,470
Tennessee	5,213	4,472	5,185	6,008	6,713
Texas	910	879	826	621	368
Utah	3,810	2,947	3,285	3,576	4,013
Virginia	13,795	12,283	13,531	15,348	18,340
Washington	2,001	1,567	1,690	1,650	1,875
West Virginia	118,646	93,288	108,362	126,438	140,886
Wyoming	5,918	5,204	5,373	5,808	6,647
Other States[d]	24	34	39	17	21
Total bituminous	446,361	349,020	395,699	461,445	512,456

[a] Final figures for 1937 and 1938, from U. S. Bur. Mines, Minerals Yearbooks. Final figures for 1939 and 1940, and preliminary figures for 1941, from U. S. Dept. Interior, Bituminous Coal Div., Weekly Coal Reports; with the exception of those for Illinois, which include all mines irrespective of size of production, from Illinois Dept. Mines and Minerals, annual Coal Reports; total figures for the U. S. include this additional production.
[b] Includes lignite.
[c] Included in "Other States."
[d] The states reporting are not identical from year to year.

TABLE 4.—PRODUCTION OF BITUMINOUS COAL IN THE UNITED STATES, AND IN ILLINOIS AND ADJACENT STATES, 1937–1941[a, b]
(In thousands of net tons)

Year	United States	Illinois		Indiana and Western Kentucky		Arkansas, Iowa, Missouri, Kansas, and Oklahoma	
1937	446,361	52,432	11.8[c]	22,126	5.0[c]	12,132	2.7[c]
1938	349,020	42,387	12.2	26,328	7.6	10,390	3.0
1939	395,699	47,627	12.0	25,234	6.4	11,236	2.8
1940	461,445	51,283	11.1	27,664	6.0	13,007	2.8
1941	512,456	55,366	10.8	34,355	6.7	13,818	2.7

[a] See footnote [a], Table 3.
[b] Includes lignite.
[c] Per cent of total U. S. production.

TABLE 5.—COAL PRODUCTION OF ALL ILLINOIS MINES,
(In

Mine Inspection District	County	SHIPPING MINES					
		Strip		Underground		Total	
		No. mines	Tons	No. mines	Tons	No. mines	Tons
14	Adams						
6	Bond			1	123,563	1	123,563
14	Brown						
1	Bureau	1	48	1	48,853	2	48,901
3	Cass						
4	Christian			5	5,477,588	5	5,477,588
8	Clinton			3	229,530	3	229,530
13	Crawford						
5	Edgar						
10	Franklin			12	10,424,178	12	10,424,178
3	Fulton	6	4,062,162	4	314,326	10	4,376,488
11	Gallatin						
7	Greene						
1	Grundy						
14	Hancock						
3	Henry	2	510,113	1	45,003	3	555,116
9	Jackson	1	684,108	1	1,271,565	2	1,955,673
10	Jefferson			1	322,506	1	322,506
7	Jersey						
3	Knox	1	591,254	1	19,495	2	610,749
1	LaSalle	3	144,995	2	209,397	5	354,392
1	Livingston						
2	Logan						
14	McDonough						
4	Macon			1	53,183	1	53,183
6	Macoupin			9	4,349,965	9	4,349,965
7	Madison			5	1,612,536	5	1,612,536
13	Marion			1	186,147	1	186,147
1	Marshall						
4	Menard						
14	Mercer						
8	Monroe						
6	Montgomery			2	799,247	2	799,247
4	Morgan						
9	Perry	2	2,847,196	9	921,917	11	3,769,113
2	Peoria			1	408,789	1	408,789
9	Randolph	1	880,861	5	772,519	6	1,653,380
14	Rock Island						
11	Saline	1	824,997	10	3,331,702	11	4,156,699
4	Sangamon			8	2,466,844	8	2,466,844
14	Schuyler	2	59,345			2	59,345
7	Scott						
4	Shelby						
2	Stark						
8	St. Clair	2	493,884	15	1,085,570	17	1,579,454

[a] Compiled from Illinois Dept. Mines and Minerals, Sixtieth Coal Report, 1941.

BY TYPE OF MINES, AND BY COUNTIES, 1941[a]
tons)

LOCAL MINES						COUNTY TOTAL			Mine Inspection District
Strip		Underground		Total					
No. Mines	Tons	No. mines	Tons	No. mines	Tons	No. mines	Tons	Percent of State	
.....	.....	1	567	1	567	1	567	.....	14
.....	.....	.....	.....	.....	.....	1	123,563	0.2	6
1	535	3	24	4	559	4	559	...	14
.....	.....	5	14,244	5	14,244	7	63,145	0.1	1
.....	.....	2	889	2	889	2	889	.....	3
.....	.....	1	10,171	1	10,171	6	5,487,759	9.9	4
.....	.....	.....	.....	.....	.....	3	229,530	0.4	8
1	10,283	1	798	2	11,081	2	11,081	.....	13
.....	.....	4	29,483	4	29,483	4	29,483	0.1	5
.....	.....	.....	.....	.....	.....	12	10,424,178	18.9	10
2	151,901	82	364,010	84	515,911	94	4,892,399	8.9	3
.....	.....	14	48,404	14	48,404	14	48,404	0.1	11
.....	.....	22	5,707	22	5,707	22	5,707	.....	7
1	60,129	4	23,164	5	83,293	5	83,293	0.1	1
2	28,861	4	1,298	6	30,159	6	30,159	0.1	14
.....	.....	18	81,145	18	81,145	21	636,261	1.1	3
1	56,626	15	66,855	16	123,481	18	2,079,154	3.8	9
4	167	.....	.....	4	167	5	322,673	0.6	10
.....	.....	2	191	2	191	2	191	.....	7
1	516	18	193,801	19	194,317	21	805,066	1.4	3
7	31,420	16	32,631	23	64,051	28	418,443	0.7	1
1	2,605	7	6,712	8	9,317	8	9,317	.....	1
.....	.....	1	28,177	1	28,177	1	28,177	0.1	2
1	3,359	18	6,640	19	9,999	19	9,999	.....	14
.....	.....	.....	.....	.....	.....	1	53,183	0.1	4
.....	.....	2	2,360	2	2,360	11	4,352,325	7.9	6
.....	.....	18	279,113	18	279,113	23	1,891,649	3.4	7
.....	.....	.....	.....	.....	.....	1	186,147	0.3	13
1	50	13	6,713	14	6,763	14	6,763	.....	1
.....	.....	14	125,553	14	125,553	14	125,553	0.2	4
.....	.....	12	19,695	12	19,695	12	19,695	0.1	14
.....	.....	1	122	1	122	1	122	.....	8
.....	.....	.....	.....	.....	.....	2	799,247	1.4	6
.....	.....	1	527	1	527	1	527	.....	4
1	20,931	7	20,962	8	41,893	19	3,811,006	6.9	9
.....	.....	63	414,788	63	414,788	64	823,577	1.5	2
.....	.....	8	40,036	8	40,036	14	1,693,416	3.1	9
.....	.....	6	17,111	6	17,111	6	17,111	0.1	14
.....	.....	16	51,897	16	51,897	27	4,208,596	7.6	11
.....	.....	15	180,154	15	180,154	23	2,646,998	4.8	4
1	100	27	54,158	28	54,258	30	113,603	0.2	14
1	6	4	435	5	441	5	441	.....	7
.....	.....	7	9,876	7	9,876	7	9,876	.....	4
.....	.....	9	10,631	9	10,631	9	10,631	.....	2
1	512,746	27	213,707	28	726,453	45	2,305,907	4.2	8

TABLE 5.—

Mine Inspection District	County	Shipping Mines					
		Strip		Underground		Total	
		No. mines	Tons	No. mines	Tons	No. mines	Tons
2	Tazewell	.....	.....	.....	.....	.....	.....
5	Vermilion	2	264,071	5	1,671,902	7	1,935,973
13	Wabash	.....	.....	.....	.....	.....	.....
14	Warren	.....	.....	.....	.....	.....	.....
13	Washington	.....	.....	2	229,416	2	229,416
1	Will	2	1,285,823	...	.....	2	1,285,823
12	Williamson	3	711,963	7	1,256,454	10	1,968,417
2	Woodford	.....	.....	1	40,304	1	40,304
	No. of mines	29		113		142	
	Total produced (1941)		13,360,820		37,672,499		51,033,319

POTENTIAL ILLINOIS COAL PRODUCTION DURING WAR YEARS[1]

That 55 million tons of coal were supplied in 1941 by Illinois coal mines (table 5) to railroads, utilities, munition plants, manufacturing establishments, army camps, and a multitude of domestic consumers is a fact of tremendous importance in our war-time economy. This was about 1/10 (table 6) of the total production of coal and lignite in the United States, but it by no means represents the total fuel requirements of the area which used nearly 58 million tons of coal moved by rail (table 10), about 13 million by lake shipments (table 12), and about 4 million tons by truck (table 5). The total coal used in the market area, exclusive of that produced in states west of Mississippi River, probably amounted to more than 75 million tons. This is in addition to the large quantities of fuel oil and gas used in the market area.

War-time conditions will not only increase the demand for coal but will impose new restrictions on the transportation of coal into the market area, on the general utilization of fuels best reserved for special uses, and on the availability of labor and of new equipment. In general, in war times, conditions of shortage are the rule, and such a condition is bound to be felt in the production of Illinois coal.

During World War I, Illinois coal mines reached the peak of their production in 1918 with an output of 88 million tons of coal from 370 shipping mines, working an average of 215 days. Approximately two million tons were also produced from local mines. At that time the use of oil and gas for the production of heat and power was much less general than at present, and restrictions had been placed upon the importation of eastern coals into the market area.

It is noteworthy that the 1941 production of Illinois coal mines was about the same as that for 1915 and that war conditions in the three years, 1915-1918, jumped the output of our mines about 30 million tons or about 50 per cent. It would appear as though a similar rapid increase in production is now under way, inasmuch as the production of 1941 increased more than four million tons over that of 1940, and the current monthly production reports issued by the Department of Mines and Minerals show an increase during the months of January to July, inclusive, of nearly six million tons above that of the preceding

[1] By Gilbert H. Cady, Senior Geologist and Head of the Coal Division, Illinois Geological Survey, Urbana.

Concluded.

Local Mines						County Total			Mine Inspection District
Strip		Underground		Total					
No. Mines	Tons	No. mines	Tons	No. mines	Tons	No. mines	Tons	Percent of State	
.....	.....	3	123,598	3	123,598	3	123,598	0.2	2
1	250	67	223,942	68	224,192	75	2,160,165	3.9	5
.....	.....	4	5,499	4	5,499	4	5,499	.....	13
.....	.....	4	7,126	4	7,126	4	7,126	.....	14
.....	.....	3	19,958	3	19,958	5	249,374	0.4	13
.....	.....	.....	.....	.....	.....	2	1,285,823	2.3	1
1	611	59	708,548	60	709,159	70	2,677,576	4.8	12
.....	.....	.....	.....	.....	.....	1	40,304	0.1	2
29	881,096	628	3,451,420	657	4,332,516	799	55,365,835	100.0	

year for shipping mines alone. Indications are that the production of 1942 will exceed by nearly 10 million tons that of 1941. And as yet, no special curtailments have been placed upon the use of gas and eastern coal, and only very light restrictions have been placed upon the use of fuel oil. That more drastic limitations on such fuels will eventually be made can scarcely be doubted except by the most sanguine.

In view of the probable expansion in the demand for Illinois coal, it is wise to review our potential production capacity so that if the capacity appears to be below the probable need, suitable steps may be taken to forestall a shortage and undesirable restrictions on the distribution and use of coal.

Table 6.—Estimated Production of Bituminous Coal in Illinois, and in the United States, by Months, 1941[a]

(In thousands of net tons)

Month	United States[b]	Illinois	
January	44,776	5,380	*12.0*[c]
February	42,334	5,045	*11.9*
March	48,682	5,833	*12.0*
April	6,030	860	*14.2*
May	43,465	3,996	*9.2*
June	43,319	3,864	*8.9*
July	44,080	4,578	*10.4*
August	46,651	4,604	*9.8*
September	47,505	4,718	*9.9*
October	51,328	4,930	*9.6*
November	44,426	4,842	*10.9*
December	48,694	5,550	*11.4*
	511,290	54,200	
Small mines in Illinois[d]	1,166	1,166	
Total	512,456	55,366	Aver. *10.8*

[a] U. S. Dept. Interior, Bituminous Coal Div., Weekly Coal Report No. W. C. R. 1299, June 13, 1942.
[b] Includes lignite.
[c] Per cent of U. S. total production.
[d] By difference.

TABLE 7.—AMOUNT AND VALUE OF COAL PRODUCED IN ILLINOIS, SHOWING NUMBER AND TYPES OF MINES, 1920–1941[a]
(In thousands of net tons, and thousands of dollars)

Year	NUMBER OF MINES				PRODUCTION (Thousands of tons)							VALUE AT MINES	
	Shipping		Local	Total	Strip			Underground			Total	(Thousands of dollars)	Average per ton[b]
	Strip	Underground	Strip and underground		Shipping	Local	Total	Shipping	Local	Total			
1919–20*	6	367	565	938	510	[c]	510	71,900	1,511	73,411	73,921	$227,677	$3.08
1920–21*	6	367	662	1,035	606	[c]	606	77,933	1,583	79,516	80,122	219,534	2.74
1921–22*	10	342	781	1,133	625	[c]	625	60,781	1,871	62,652	63,277	182,781	2.89
1922–23*	8	366	762	1,136	951	[c]	951	72,460	2,103	74,563	75,514	188,785	2.50
1923–24*	17	312	703	1,032	1,498	[c]	1,498	68,826	1,985	70,811	72,309	164,141	2.27
1924–25*	18	237	658	913	3,054	[c]	3,054	61,126	1,994	63,120	66,174	144,921	2.19
1925**	18	237	613	868	1,787	[c]	1,787	34,045	1,180	35,225	37,012	81,056	2.19
1926	16	228	677	921	3,583	[c]	3,583	64,253	1,977	66,230	69,813	149,400	2.14
1927	15	226	665	906	2,757	[c]	2,757	42,169	2,024	44,193	46,950	101,412	2.16
1928	15	191	651	857	4,224	122	4,346	50,060	1,805	51,865	56,211	112,422	2.00
1929	17	183	603	803	5,251	99	5,350	53,825	1,953	55,778	61,128	114,309	1.87
1930	15	170	754	939	6,220	56	6,276	45,777	1,982	47,759	54,035	94,021	1.74
1931	16	151	827	994	6,549	71	6,620	36,524	2,009	38,533	45,153	76,760	1.70
1932	17	145	931	1,093	6,628	129	6,757	24,774	2,590	27,364	34,121	52,205	1.53
1933	20	139	1,107	1,266	5,599	115	5,714	29,792	2,814	32,606	38,320	55,950	1.46
1934	26	146	1,175	1,347	6,008	214	6,222	32,647	2,855	35,502	41,724	65,089	1.56
1935	28	154	1,168	1,350	7,135	346	7,481	34,275	3,257	37,532	45,013	70,220	1.56
1936	30	146	1,066	1,242	8,873	474	9,347	38,412	3,717	42,129	51,476	79,788	1.55[d, e]
1937	31	137	852	1,020	11,176	550	11,726	36,886	3,820	40,706	52,432	82,318	1.57[d, e]
1938	25	124	820	969	10,059	620	10,679	28,384	3,324	31,708	42,387	63,581	1.50[d, e]
1939	26	120	830	976	11,296	990	12,286	31,698	3,643	35,341	47,627	78,108	1.64[d, f]
1940	27	112	749	888	12,025	1,255	13,280	34,047	3,955	38,002	51,283	86,667	1.69[d, f]
1941	29	113	657	799	13,361	881	14,242	37,673	3,451	41,124	55,366	100,212	1.81[d, e]
20-year average (1920–1939, incl.)					5,092	315[g]	5,277	48,612	2,439	51,051	56,328	$117,291	$2.08

[a] Compiled from Illinois Dept. Mines and Minerals, Annual Coal Reports, revised.
[b] U. S. Bur. Mines, Minerals Yearbooks.
[c] Production of Local Strip Mines included with that of Local Underground Mines.
[d] Values beginning with 1936 include selling expense.
[e] Calculated.
[f] U. S. Dept. Interior, Bituminous Coal Div., Weekly Coal Reports.
[g] Average for 12 years.
* Fiscal year: July 1-June 30 inc.
** July 1-Dec. 31, 1925.

Current statistics published by the Department of Mines and Minerals give some idea of the production capacity of our coal mines. The record of monthly production of coal reveals a pronounced seasonal fluctuation. A considerably expanded production would be achieved if such seasonal fluctuation could be eliminated.

The maximum monthly production of coal in Illinois in 1941 was in March and amounted to 5,833,000 tons, produced in anticipation of a shutdown in April owing to labor adjustments. In March 1941 most shipping mines, accredited with a total production of 5,468,000 tons, worked more than 20 days, and 24 mines out of 143 worked 25 to 27 days. The production of 1941 could have been stepped up to about 70 million tons if the mines had worked each month to equal the production of March. However, such a stepping up of production in 1941 would have had to be concentrated in fewer than the total number of mines listed as operating during 1941, because three of the mines listed were abandoned in that year and four more ceased production and are either idle or abandoned. At least one, and probably two more additional mines were abandoned in 1942. Two large and two small strip mines were opened in 1942. The net result appears to be a reduction of about five from the mines listed as operating during 1941. No new underground shipping mines are known to have been opened during 1942. Certain mines that have been idle for some time, that is before 1941, may have been reopened.

A further limitation on the capacity of mines to maintain output at the March 1941 level exists with respect to strip mine operations. Days of operation, as given in the Coal Report, represent the days in which a mine is actually loading coal. The stripping shovel is the bottle-neck in open-cut operations, and production rate is determined by the stripping rate. Consequently the stripping shovel is commonly in operation two or more shifts and may be working when loading equipment is idle. Obviously stepping up production will be impossible beyond a definite capacity to remove overburden. This capacity is probably reached or nearly reached at present.

There are no statistics available concerning the working time of stripping shovels in Illinois open-cut mines. It is of interest to note, however, that the average number of days worked by strip mines (exclusive of 10 that either were abandoned in 1941 or were small operations working only in the winter months) was 224 days. These mines produced about 13 million tons out of a total of about 13,300,000 produced by all the shipping strip mines. It is obvious that even on the basis of a 260-day year these mines cannot increase their production with present equipment and personnel more than about 16 per cent or to about 15½ million tons. The four new strip mines coming into production in 1942 may provide an additional production capacity of about 1½ million tons, but this will probably be largely offset by abandonment and decline of other mines. It is very doubtful, therefore, that during the present crisis strip mine production can attain more than 17½ million tons.

Some limitation on the stepping-up process would probably result from restrictions on the use of St. Clair County coal in St. Louis. In 1941 only four out of 17 shipping mines worked more than 170 days. The average number of days worked for all shipping mines was 142 days, seven mines working less than 100 days. Undoubtedly, this relative slackness of coal production was at least in part the result of restrictions placed by St. Louis on unwashed and unprocessed coal. With such a barrier removed, shipping mine production might be stepped up considerably above that of 1941, but by no means to double that amount because a large part of the 1941 production was by mines working more than 200 days, and an addition of 422,000 tons was produced by a strip mine already working nearly to the limit of workable depth with the equipment available. Of the other 13 mines, only 11 remain in production and these produced

320,000 tons in 1941, working an average of 110 days. Working 260 days, these mines might produce 752,000 tons. It is very doubtful whether all these mines could increase their production proportionately so that the total possible production does not appear to be much over 2½ million tons as compared with 1½ million in 1941, and such increase cannot be expected in the face of continued prohibition from the St. Louis market. This is a conclusion which of course does not involve the question of merits or demerits of such exclusion, but simply indicates the probable effect.

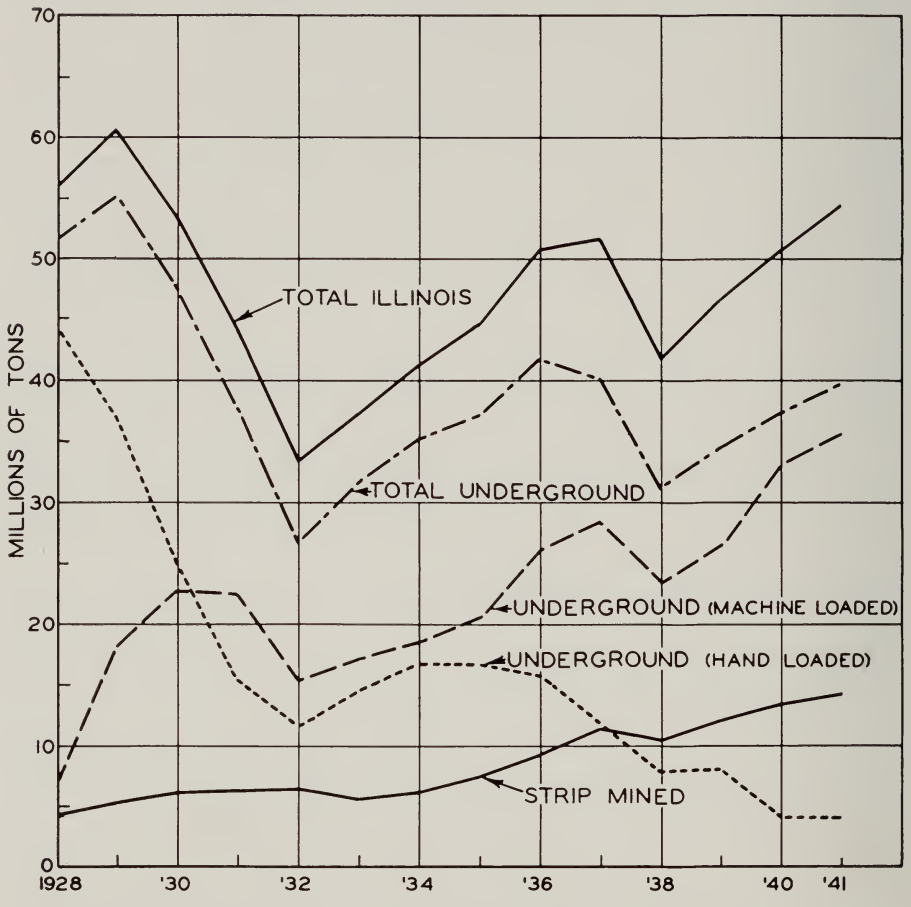

FIG. 3.—Annual production of Illinois coal, classified according to mining methods, 1928-1941.

In 1941, 12 mines in Franklin County operated an average of only 170 days. None of the mines operated more than 185 days and except for two mines all worked between 159 and 174 days. An increase in working time to 260 days might increase the production from about 10½ to about 16 million tons, that is, an increase of 5½ million tons. However, this possibilty is somewhat limited by the fact that some of these mines are laboring under restricted operating conditions imposed by impurities in the bed and by limited reserves.

There remain 79 shipping underground mines not located within either Franklin or St. Clair counties. Eight of these worked an average of 267 days, producing nearly 2½ million tons of coal. Not much increase can be expected

in the production of these mines. Sixteen other mines producing about 10½ million tons worked an average of 236 days. Increasing the number of operating days to 260, or about 1/10 the running time in 1941, might effect a corresponding increase in production of about one million tons. The remaining 55 underground mines working an average of 156 days produced only about 11 million tons.

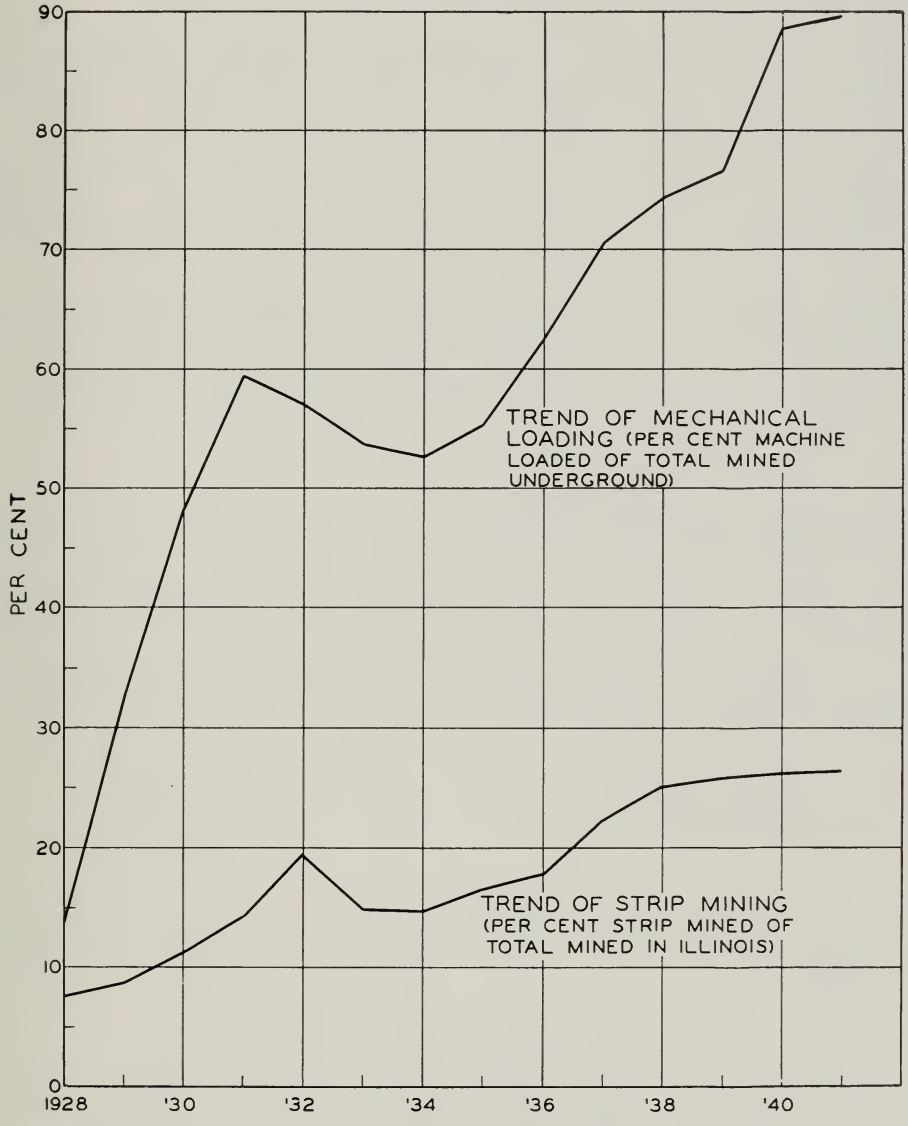

Fig. 4.—Trends in mechanization in Illinois coal mines, 1928-1941.

The potential capacity of these mines working 260 days under the same conditions is about 19 million tons, an increase of 67 per cent, or about 8 million tons.

The probability of such additional tonnage from the 55 small tonnage mines with the same equipment and man power is not substantial. In the first place, examination of the records will reveal that only 13 of these mines are operations that have started within the last eight to 10 years. These, with one or

TABLE 8.—STRIP COAL PRODUCED BY SHIPPING MINES
(Net

County	District	January	February	March	April	May
Bureau	1	—	—	—	—	—
Fulton	3	398,660	362,109	418,954	738	324,391
Henry	3	44,354	46,237	54,695	444	44,561
Jackson	9	53,293	53,164	61,166	—	58,790
Knox	3	64,883	57,880	77,167	—	36,558
LaSalle	1	22,853	20,919	14,949	2,049	3,801
Perry	9	291,628	241,418	271,524	—	203,761
Randolph	9	74,370	70,891	84,122	—	71,297
St. Clair	8	48,749	44,971	69,802	20,948	22,893
Saline	11	68,141	80,731	83,434	47,987	81,548
Schuyler	14	5,402	5,121	4,378	668	—
Vermilion	5	32,411	28,542	38,002	16,141	28,068
Will	1	143,255	116,134	146,166	17,495	103,433
Williamson	12	63,521	66,432	82,228	9,706	54,300
Total		1,311,520	1,194,549	1,406,587	116,176	1,033,401

[a] Compiled from Illinois Dept. Mines and Minerals, Sixtieth Coal Report, 1941.

two exceptions, are small operations which if they worked the full 260 days would each produce less than 100,000 tons. One or two mines recently opened are capable of considerably expanded production over that of 1941 but of relatively little above that of the present year. Many of the 55 mines are 40 to 50 years old or more and are hampered by archaic layout, long haulage, difficult ventilation, and limited reserves.

Summarizing the results of these considerations, the possible additional tonnage available from Illinois shipping mines above the amount produced in 1941 is estimated as follows:

	Tons
St. Clair County	1,000,000
Franklin County	5,500,000
Stripping mines	4,500,000
Other underground mines	9,000,000
	20,000,000

This additional production, assuming that the output of local mines is maintained at the same level as in 1941, would result in a total possible production of about 75 million tons.

MECHANIZATION IN ILLINOIS COAL MINES

Production of coal by strip mining is highly developed in Illinois. Production by this process by shipping mines is shown in table 8, by counties and by months during 1941. Total strip production was more than 14,241,000 tons, or more than 26 per cent of the total for the State. Illinois again led all the states in volume of coal produced by strip mining. Underground mining also continued its marked trend toward mechanization during 1941, by rapid increase in the proportion of coal which was machine-loaded.

Table 9 shows the trend of strip mining, as indicated by the amount of coal strip-mined each year from 1928 to 1941, inclusive, with its percentage of the total mined in Illinois, and the trend of mechanical loading as indicated by

IN ILLINOIS, 1941, BY COUNTIES AND BY MONTHS[a]
tons)

June	July	August	September	October	November	December	Total for Shipping Mines
—	—	—	—	—	—	48	48
313,073	290,127	351,272	371,043	415,507	377,469	438,819	4,062,162
46,798	40,219	48,330	49,079	44,594	43,627	47,175	510,113
43,771	56,907	45,477	72,975	83,917	72,799	81,849	684,108
35,874	46,851	47,040	61,196	39,458	56,761	67,586	591,254
3,892	1,326	9,714	15,027	13,537	17,523	19,405	144,995
228,289	259,091	257,136	271,356	288,737	254,434	279,822	2,847,196
76,110	83,371	84,943	85,148	84,412	76,349	89,848	880,861
43,666	38,261	38,351	33,242	42,445	41,615	48,941	493,884
79,689	60,449	58,463	64,370	68,824	63,636	67,725	824,997
—	—	939	6,622	8,982	13,565	13,668	59,345
14,254	15,051	12,868	13,331	16,801	22,935	25,667	264,071
90,551	87,734	100,458	116,147	123,498	115,240	125,712	1,285,823
45,807	77,626	72,391	63,353	57,548	62,429	56,622	711,963
1,021,774	1,057,013	1,127,382	1,222,889	1,288,260	1,218,382	1,362,887	13,360,820
				Production of Local Strip Mines (see Table 5)			881,096
				Total Strip Mine Production			14,241,916

TABLE 9.—TRENDS IN MECHANIZATION IN ILLINOIS COAL MINES, 1928–1941[a]
(In thousands of net tons)

Year	Strip Mined		Mined Underground				Total mined in Illinois
	Amount	Per cent[b]	Hand loaded	Machine loaded		Total	
				Amount	Per cent[c]		
1928.....	4,339	*7.8*	44,638	6,971	*13.5*	51,609	55,948
1929.....	5,375	*8.9*	37,031	18,252	*33.0*	55,283	60,658
1930.....	6,116	*11.4*	24,768	22,847	*48.0*	47,615	53,731
1931.....	6,326	*14.3*	15,401	22,577	*59.4*	37,978	44,304
1932.....	6,551	*19.6*	11,564	15,360	*57.0*	26,923	33,475
1933.....	5,625	*15.0*	14,667	17,122	*53.9*	31,789	37,414
1934.....	6,160	*14.9*	16,630	18,482	*52.6*	35,112	41,272
1935.....	7,410	*16.6*	16,602	20,513	*55.3*	37,115	44,525
1936.....	9,113	*17.9*	15,704	26,110	*62.4*	41,814	50,927
1937.....	11,449	*22.2*	11,809	28,344	*70.6*	40,153	51,602
1938.....	10,570	*25.2*	7,978	23,363	*74.5*	31,342	41,912
1939.....	12,089	*25.8*	8,124	26,570	*76.6*	34,694	46,783
1940[d].....	13,273	*26.2*	4,173	33,164	*88.8*	37,337	50,610
1941[d].....	14,238	*26.3*	4,090	35,872	*89.9*	39,962	54,200

[a] U. S. Dept. Interior, Bituminous Coal Div., Weekly Coal Report No. W.C.R. 1303, July 11, 1942, and Sixteenth Census of the U. S. 1940, Mineral Industries, 1939. Does not include mines with daily production less than 50 tons.
[b] Per cent of total mined in Illinois.
[c] Per cent of total mined underground.
[d] Illinois Dept. Mines and Minerals, Sixtieth Coal Report, 1941.

TABLE 10.—ORIGIN AND DESTINATION OF REVENUE RAILROAD SHIPMENTS OF COAL INTO THE
(Exclusive of non-rev–
(In net

From	To: Chicago District	Illinois, other[b]	Milwaukee, Wis.	Wisconsin, other	Council Bluffs, Iowa	Iowa, other
1940						
Western Penna.	2,034	40	40	277	.....	52
Cen. Penna., Somerset-Myersdale, Cumberland-Piedmont.	15,115	3,908	194	5,513	660	10,589
Fairmont, W. Va.	72,784	4,929	.....	408	.....	1,052
N. and E. Ohio	1,117	318	34	993	.....	1,307
S. Ohio	500	.....	.....	.....	.....	359
Kanawha, Logan, Kenova-Thacker	1,032,100	100,082	654	14,650	512	172,902
New River-Winding Gulf, Pocahontas-Tug River	7,188,931	405,153	69,068	587,122	41	71,709
NE. Kentucky, McRoberts.	1,180,704	103,595	4,279	26,753	41	132,308
Virginia	251,938	44,162	3,014	67,518	42	13,622
Hazard, Harlan, S. Appalachians	3,027,320	412,803	5,822	40,961	345	534,351
Ex-river coal	43	856	.....	.....	.....	.....
N. Illinois	585,943	2,803,745	45	199,034	.....	1,155,135
Cent. and S. Illinois	4,770,944	9,230,374	60,452	1,200,737	19,478	1,498,372
Indiana	2,847,860	1,273,004	113,233	610,717	102	459,927
Western Kentucky	532,695	307,935	1,466	113,411	3,402	252,286
Grand total	21,510,028	14,690,904	258,301	2,868,157	24,623	4,303,971
Per cent of change over 1939	+16.7	+13.9	+ 8.0	+13.5	— 3.6	+11.1
1941						
Western Penna.	1,130	18,883	.....	.....	.....	34
Cent. Penna., Somerset-Myersdale, Cumberland-Piedmont.	22,908	5,751	392	6,714	692	9,673
Fairmont, W. Va.	100,233	7,939	.....	228	.....	1,042
N. and E. Ohio	859	188	.....	394	.....	870
S. Ohio	1,725	.....	.....	.....	.....	243
Kanawha, Logan, Kenova-Thacker	1,483,730	110,467	765	16,176	394	170,757
New River-Winding Gulf, Pocahontas-Tug River	9,360,947	436,525	65,772	637,635	.....	69,218
NE. Kentucky, McRoberts.	1,370,140	92,158	269	21,111	.....	118,685
Virginia	222,790	43,028	2,867	65,311	46	12,773
Hazard, Harlan, S. Appalachians	3,473,161	425,852	502	46,445	297	581,815
N. Illinois	523,974	3,327,901	.....	209,601	.....	1,114,591
Cent. and S. Illinois	5,272,813	10,637,836	48,474	1,378,809	27,768	1,477,508
Indiana	3,437,543	1,405,800	228,919	855,280	267	524,517
Western Kentucky	650,446	359,146	1,073	136,600	4,780	267,329
Grand total	25,922,399	16,871,474	349,033	3,374,304	34,244	4,349,055
Per cent of change over 1940	+20.5	+14.8	+35.1	+17.6	+39.1	+ 1.0

[a] Data from U. S. Dept. Interior, Bituminous Coal Div., Monthly Coal Distribution Report, No. 124, April 3, 1942.
[b] Includes Davenport, Iowa, for shipments from Ohio and the Crescent; includes Daven-

ILLINOIS COAL MARKET AREA IN 1940–1941[a]
enue railroad fuel)
tons)

St. Louis, Mo.[c]	Kansas City, Mo.	St. Joseph, Mo.	Missouri, other	Kansas, other	Nebraska, other	Minnesota	South Dakota	North Dakota	Total
				1940					
.....	.....	.....	.....	.....	.....	.....	.....	.....	2,443
4,736	767	376	1,617	1,199	1,115	4,992	1,037	.....	51,818
655	.....	.....	.....	.....	.....	31	.....	.....	79,859
.....	.....	.....	.....	.....	.....	173	.....	.....	3,942
.....	.....	.....	.....	.....	.....	157	.....	.....	1,016
181,281	.....	.....	747	.....	.....	7,151	441	.....	1,510,520
425,433	.....	.....	653	44	35	103,155	9,183	.....	8,860,527
.....	.....	.....	811	.....	435	18,277	2,291	.....	1,469,494
157,716	.....	.....	251	.....	.....	12,143	1,738	.....	552,207
18,076	.....	.....	663	.....	1,020	25,676	1,390	.....	4,068,427
.....	.....	.....	.....	.....	.....	.....	.....	.....	899
.....	.....	.....	281	.....	32	57,295	172	.....	4,801,682
3,748,905	6,405	6,543	1,107,557	12,950	84,904	325,466	103,351	792	22,177,230
42,290	155	.....	4,002	.....	1,723	89,509	1,855	.....	5,444,377
59,775	.....	.....	34,750	.....	3,459	63,856	22,125	2,920	1,398,080
4,638,867	7,327	6,919	1,151,332	14,193	92,723	707,881	143,583	3,712	50,422,521
+19.6	+288.3	+23.2	+27.6	+27.1	+10.1	+2.2	+12.7	—52.7	+15.0
				1941					
.....	.....	.....	.....	.....	.....	.....	.....	.....	20,047
24,771	504	304	1,547	1,210	1,260	5,373	943	.....	82,042
1,623	.....	.....	.....	.....	.....	.....	.....	.....	111,065
.....	.....	.....	.....	.....	.....	34	.....	.....	2,345
.....	.....	.....	.....	.....	.....	.....	.....	.....	1,968
177,927	.....	.....	346	.....	.....	5,892	459	.....	1,966,913
575,529	.....	.....	448	59	30	69,814	4,665	.....	11,220,642
.....	.....	.....	809	.....	289	21,256	1,358	.....	1,626,075
289,355	.....	.....	267	.....	.....	9,945	1,349	.....	647,731
23,997	.....	.....	693	.....	903	29,188	1,475	.....	4,584,328
.....	.....	.....	4,240	.....	119	39,218	254	.....	5,219,898
3,595,647	10,228	4,237	1,143,436	12,229	72,716	348,151	110,525	532	24,140,909
14,415	275	.....	1,925	.....	1,285	80,245	1,277	.....	6,551,748
88,963	.....	.....	42,088	.....	5,091	55,256	13,323	1,756	1,625,851
4,792,227	11,007	4,541	1,195,799	13,498	81,693	664,372	135,628	2,288	57,801,562
+3.3	+50.2	—34.4	+3.9	—4.9	—11.9	—6.1	—5.5	—38.4	+14.6

port, Bettendorf, and Iowanna, Iowa, for shipments from Illinois, Indiana, and Western Kentucky; excludes East St. Louis, Illinois.
[c] Includes East St. Louis, Illinois.

the amount of coal machine-loaded with its percentage of the total mined underground. During the 14-year period covered by this table, the proportion of coal strip-mined increased from 7 to 26 per cent of the total mined, while the proportion of coal machine-loaded increased from 13 to 89 per cent of the amount mined underground.

The methods of mining Illinois coal, with the annual production by each method, from 1928 to 1941, inclusive, are shown in figure 3. The increasing mechanization of Illinois mines is demonstrated for the same period in figure 4, showing the trend of mechanical loading by the percentage of the total mined underground which was machine-loaded, and the trend of strip mining by its percentage of the total mined. This great increase in mechanized methods of production has done much to reduce costs and enable the industry to stabilize its markets under severe competitive conditions.

Distribution

The Illinois coal market area comprises the states of Illinois, Wisconson, Iowa, Missouri, Kansas, Nebraska, Minnesota, South Dakota, and North Dakota. The principal producing districts which supply this market area are

Table 11.—Origin of Lake Cargo Coal, 1939–1941[a, b]
(In thousands of net tons)

From	1939	1940	1941
Ohio	2,356	2,646	3,947
Pennsylvania	9,259	11,578	11,612
Moundsville	266	308	395
Fairmont, Cumberland–Piedmont	1,697	2,049	2,568
Southern W. Va.—Low volatile	8,665	10,372	9,010
Southern W. Va.—High volatile	10,883	12,025	14,277
Eastern Ky., Tenn., and Va.	7,998	9,133	9,585
Total	41,124	48,111	51,394

[a] U. S. Dept. Int., Bituminous Coal Division, Monthly Coal Report No. 123, Mar. 3, 1942.
[b] Includes vessel fuel.

Table 12.—Lake Cargo Shipments and Receipts of Coal at Upper Lake Docks, 1934–1941[a]
(In thousands of net tons)

Year	Bituminous coal loaded into vessels at Lake Erie ports	Receipts at		Total receipts
		Lake Superior ports	Lake Michigan ports[b]	
1934	34,869	8,023	4,535	12,558
1935	34,730	6,829	4,043	10,872
1936	44,011	9,358	5,114	14,472
1937	43,645	9,115	4,822	13,937
1938	34,173	6,614	3,758	10,372
1939	39,837	6,515	4,229	10,744
1940	46,548	6,991	4,436	11,427
1941	49,733	8,356	4,830	13,186

[a] U. S. Dept. Int., Bituminous Coal Division, Monthly Coal Distribution Report, No. 123, Mar. 3, 1942.
[b] Ports on Lake Michigan west shore, not including Waukegan or Chicago.

Districts Nos. 7 and 8 (southern districts of the Bituminous Coal Division classification) in the Appalachian region, and Districts 9 (Western Kentucky), 10 (Illinois), and 11 (Indiana) in the Interior coal basin. Much of the coal consumed in this area is shipped in by rail. Table 10 gives a detailed distribution report of all-rail coal shipped into this area during 1940 and 1941, showing quantities of coal shipped into each of the principal divisions of the market area from the various producing localities, and the percentage of change from the preceding year for each division of the area.

A large amount of coal from the Appalachian region comes in by water. This cargo coal is shipped by rail from the mines to Lake Erie ports, then by vessels on the Great Lakes to ports on Lake Michigan and Lake Superior, where it is consumed or shipped farther by rail. Large vessels and mechanical handling equipment for transfer from rail to water carriers enables this method of transportation to carry coal at less cost than all-rail shipments. Its operation is limited to the season of navigation on the Great Lakes, usually about eight months of the year. The producing districts where this lake cargo coal originates and the amount of shipments are shown in table 11 for the past three years. This includes vessel fuel as well as cargo coal. The volume of lake cargo shipments of bituminous coal and the receipts at upper lake docks for the past eight years are shown in table 12.

Constantly increasing amounts of coal are shipped in the Illinois coal market area on inland waterways, the Illinois and the upper Mississippi rivers. These shipments are shown in table 13. Coal tonnage during 1941 increased 30 per cent over that for 1940 on the Illinois River, and increased 11 per cent on the upper Mississippi River.

TABLE 13.—COAL SHIPMENTS ON INLAND WATERWAYS, 1937–1941[a]
(In net tons)

Year	Illinois River	Upper Mississippi River
1937	490,862	127,206
1938	956,120	178,276
1939	1,700,000	407,446
1940	1,976,189	652,898
1941	2,562,381	725,000

[a] Compiled from Chicago Regional Port Commission, "Interstate Port Handbook, 1942."

Table 14.—Coal Shipments into Chicago, Illinois,
(In net

Year / Month / Field of origin	Western Penn.	Central Penn.	Fairmont	Northern and Eastern Ohio	Southern Ohio	Kanawha	New River
1941							
January	104	1,273	12,009	103	96	96,694	979,505
February	254	2,483	9,785	140	—	99,830	963,894
March	—	2,271	9,476	167	—	127,120	1,066,181
April	—	825	821	—	—	9,156	64,199
May	47	1,677	5,503	—	1,468	77,421	822,825
June	—	1,416	7,085	—	—	120,258	920,190
July	105	2,571	9,259	—	—	127,963	846,009
August	43	2,559	13,082	213	—	127,442	894,473
September	86	2,972	9,037	36	52	128,061	660,080
October	362	2,624	8,000	101	—	197,036	635,717
November	66	1,254	8,005	48	109	173,207	664,341
December	63	983	8,171	51	—	199,542	843,533
Total 1941	1,130	22,908	100,233	859	1,725	1,483,730	9,360,947

[a] U. S. Dept. Interior, Bituminous Coal Div., Monthly Coal Distribution Reports.

Chicago Coal Supply

The largest center of consumption in the Illinois coal market area is Chicago and vicinity. Table 14 shows bituminous coal shipments into Chicago by months during 1941, giving the fields of origin. Of the nearly 26 million tons shipped into Chicago, 22.3 per cent was produced in Illinois, but the largest amount, 36 per cent came from New River field in West Virginia.

St. Louis Coal Supply

The St. Louis area has always been an important market for Illinois coal. Their smoke elimination ordinance caused a decided increase in the use of coal from the Appalachian fields, but the vigorous efforts of the Illinois coal operators to retain their natural market, through special preparation of their coal to reduce smoke, has met very substantial success. Table 15 shows the volume and sources of coal shipped into St. Louis during 1940 and 1941 by months, with the percentage change in each field. Illinois furnished 75.3 per cent of the 4,790,000 tons of bituminous coal used in the St. Louis area during 1941. St. Louis also ships in some coal from Arkansas and Oklahoma but information in regard to this is not available.

BY FIELDS OF ORIGIN, AND BY MONTHS, 1941[a]
tons)

North-eastern Kentucky	Virginia	Hazard	Northern Illinois	Central and Southern Illinois	Indiana	Western Kentucky	Total	Illinois per cent of total
217,911	21,780	428,398	65,348	566,703	348,096	70,050	2,808,070	22.5
205,247	20,920	374,279	52,329	535,369	309,057	66,086	2,639,673	22.2
183,778	19,117	402,225	51,764	616,114	428,362	70,218	2,976,793	22.4
4,888	2,816	10,278	3,904	101,385	45,767	55,056	299,095	35.2
57,382	13,301	306,079	36,211	374,438	266,629	39,748	2,002,729	20.5
73,314	17,952	319,009	27,307	390,100	220,768	39,690	2,137,089	19.5
63,973	26,615	315,001	29,036	420,011	243,861	39,239	2,123,643	22.4
83,621	26,347	304,801	50,999	424,734	265,612	41,372	2,235,298	20.6
70,263	22,929	277,971	51,676	410,481	267,671	38,652	1,939,967	25.1
88,598	22,382	251,065	51,022	437,099	324,247	47,333	2,065,586	25.3
118,503	14,686	161,579	50,247	473,029	345,636	63,733	2,074,443	27.8
202,662	13,945	322,476	54,131	523,350	371,837	79,269	2,620,013	22.0
1,370,140	222,790	3,473,161	523,974	5,272,813	3,437,543	650,446	25,922,399	22.3

DEGREE-DAYS FOR ILLINOIS AND THE ILLINOIS COAL MARKET AREA

The importance of climatological data in the marketing of coal and other fuels used in space heating and in air-conditioning is being increasingly recognized. The fluctuation of demand for coal and other fuels, as affected by seasonal changes in temperature, is best indicated by tables of degree-days calculated from average temperatures reported from U. S. Weather Bureau stations over long periods of time.

Degree-days are the number of degrees of temperature that the average temperature for each day falls below 65° Fahrenheit. These are totaled for each month and a cumulative total for the heating season through each month is determined. These data averaged over a long period of time give a reliable guide to the fuel needs of the locality in which the temperatures are recorded.

Table 16 gives the average number of degree-days for various cities and towns in Illinois, and for principal cities in the Illinois coal market area, where the U. S. Weather Bureau has kept records of average daily temperatures up to and including 1941. The number of years on which these calculations are based is listed under the name of each town. The monthly averages (M) and cumulative averages (C) for the heating season through each month are given for each of the 81 stations.

Figure 5 gives this information in graphic form on a map showing areas of equal degree-days for Illinois and the adjacent region. The cumulative average is given for each city.

TABLE 15.—COAL SHIPMENTS INTO ST. LOUIS, MISSOURI, BY FIELDS OF ORIGIN AND BY MONTHS, IN 1940 AND 1941[a]
(In net tons)

Year / Month / Field of Origin	Central Penn.	Fairmont	Kanawha	New River	Virginia and N. E. Kentucky	Hazard, Harlan	Central and Southern Illinois	Indiana	Western Kentucky	Total	Illinois per cent of total
1940											
January	78	.....	17,295	10,965	359	2,362	598,678	18,248	22,683	670,668	88.6
February	209	.....	16,881	10,156	252	2,155	376,802	8,522	9,954	424,931	88.5
March	444	.....	15,744	11,606	102	1,856	305,776	2,340	1,658	339,526	90.0
April	409	.....	14,577	10,023	419	1,195	246,534	1,220	748	275,125	89.5
May	337	77	13,324	14,733	1,193	1,186	231,559	94	2,741	265,244	87.0
June	203	.....	13,161	28,630	8,118	874	222,337	280	1,078	274,681	81.0
July	363	.....	13,473	44,518	13,873	571	298,519	1,582	1,498	374,397	79.8
August	320	77	14,161	60,696	23,241	576	278,346	2,524	1,999	381,940	73.0
September	477	128	14,131	66,296	31,769	833	300,221	3,308	7,928	425,091	70.8
October	740	171	14,195	73,048	33,955	1,242	271,018	1,873	2,924	399,166	67.8
November	690	56	14,594	53,124	22,933	2,049	291,942	1,048	3,547	389,983	75.0
December	466	146	19,745	41,638	21,502	3,177	327,173	1,251	3,017	418,115	78.0
Total, 1940	4,736	655	181,281	425,433	157,716	18,076	3,748,905	42,290	59,775	4,638,887	81.0
Per cent of change over 1939	+41.0	—	+ 3.6	+238.5	+677.5	—	+ 8.5	—31.8	+59.1	+19.6	— 9.0
1941											
January	1,330	274	15,674	54,648	32,711	2,264	336,113	2,168	4,712	449,894	74.7
February	1,022	202	13,316	46,828	28,590	2,491	314,245	1,547	4,123	412,364	76.2
March	689	148	15,335	44,584	27,202	3,054	408,810	588	6,621	507,031	80.6
April	102	—	607	1,701	616	—	79,520	—	3,792	86,338	92.1
May	781	45	12,923	20,704	6,866	2,647	249,643	—	11,640	305,249	81.7
June	1,634	139	23,718	50,326	26,391	1,222	316,742	361	8,610	429,143	73.8
July	4,304	54	14,277	60,657	24,998	1,222	357,283	2,384	15,435	480,614	74.3
August	2,800	48	18,310	63,358	26,129	1,781	378,623	1,636	16,909	509,594	74.3
September	3,621	205	14,219	51,611	24,191	2,036	261,843	1,864	3,599	363,189	72.0
October	4,874	276	15,758	73,922	33,388	2,138	269,282	2,209	2,959	404,806	66.5
November	2,600	87	15,078	64,828	34,487	2,291	291,143	687	4,196	415,397	70.0
December	1,014	145	18,712	42,362	23,786	2,851	332,400	971	6,367	428,608	77.5
Total, 1941	24,771	1,623	177,927	575,529	289,355	23,997	3,595,647	14,415	88,963	4,792,227	75.3
Per cent of change over 1940	+423.0	+147.7	— 1.9	+35.2	+83.4	+32.7	— 4.0	—65.9	+48.8	+ 3.3	— 7.0

[a] U. S. Dept. Int., Bituminous Coal Div., Monthly Coal Distribution Reports, M.C.D. Nos. 113—124.

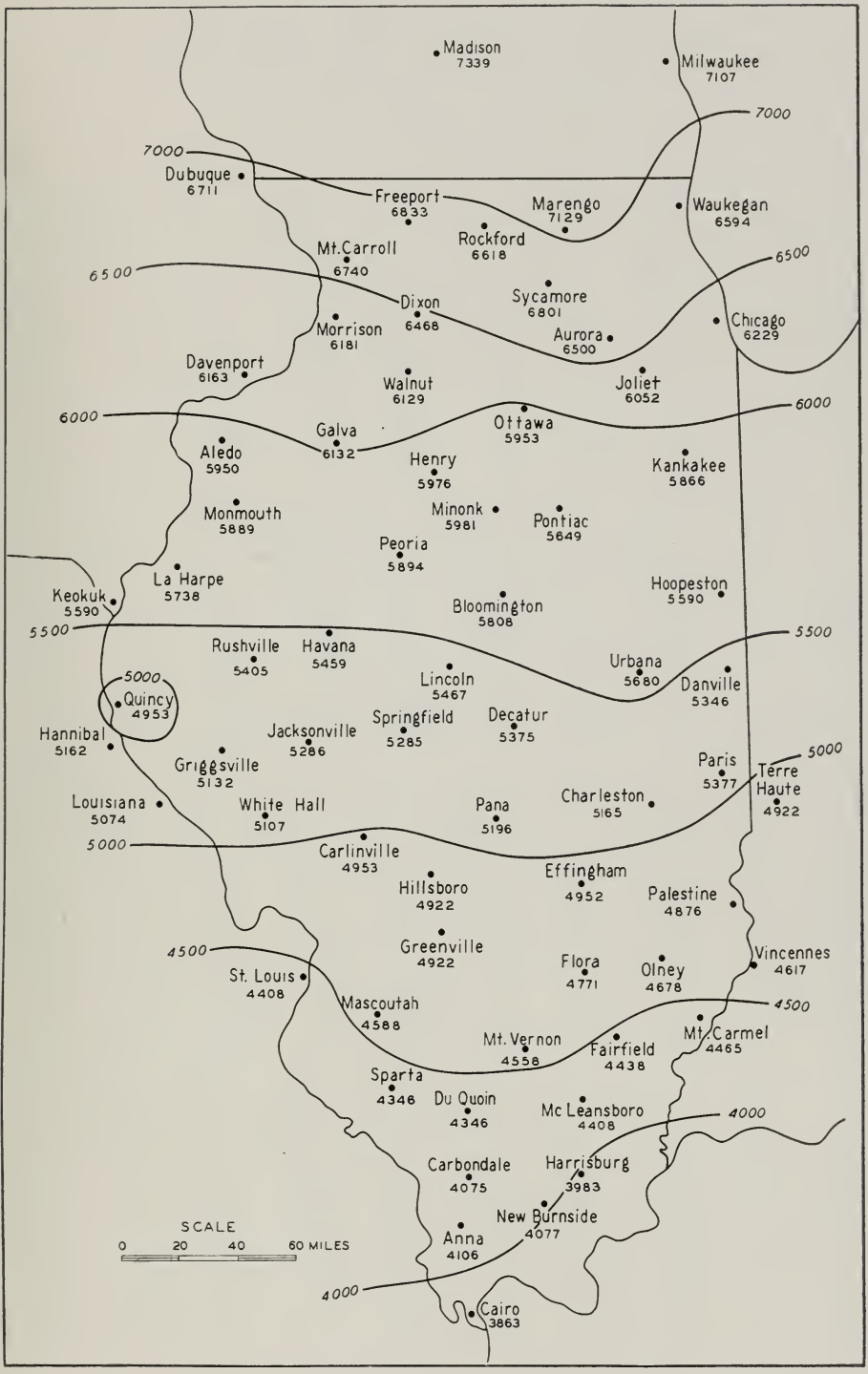

FIG. 5.—Degree-day map of Illinois and adjacent region showing cumulative average degree-days (based on data through 1941). Degree-days are the number of degrees of temperature that the average daily temperature falls below 65° F., and are totalled for the heating season.

TABLE 16.—AVERAGE NUMBER OF DEGREE-DAYS FOR CITIES AND TOWNS IN ILLINOIS, AND FOR PRINCIPAL CITIES IN THE ILLINOIS COAL MARKET AREA

COMPUTED FOR THE PERIOD OVER WHICH SUCH RECORDS HAVE BEEN KEPT, THROUGH 1941 [a]

M=Monthly Average Degree-Days
C=Cumulative Average Degree-Days

Illinois

Month	Aledo (41 years)		Aurora (62 years)		Anna (57 years)		Bloomington (50 years)	
	M	C	M	C	M	C	M	C
September	0	0	30	30	0	0	0	0
October	341	341	403	433	155	155	310	310
November	750	1,091	810	1,243	540	695	720	1,030
December	1,147	2,238	1,178	2,421	868	1,563	1,085	2,115
January	1,271	3,509	1,333	3,754	961	2,524	1,209	3,324
February	1,092	4,601	1,120	4,874	784	3,308	1,316	4,640
March	806	5,407	930	5,804	558	3,866	806	5,446
April	450	5,857	510	6,314	240	4,106	300	5,746
May	93	5,950	186	6,500			62	5,808
	Cairo (69 years)		Carbondale (37 years)		Carlinville (51 years)		Charleston (56 years)	
September	0	0	0	0	0	0	0	0
October	155	155	155	155	248	248	279	279
November	510	665	540	695	630	878	660	939
December	806	1,471	868	1,563	992	1,870	992	1,931
January	899	2,370	930	2,493	1,116	2,986	1,116	2,047
February	756	3,126	784	3,277	924	3,910	952	3,999
March	527	3,653	558	3,835	682	4,592	713	4,712
April	210	3,863	240	4,075	330	4,922	360	5,072
May					31	4,953	93	5,165
	Chicago (71 years)		Danville (39 years)		Decatur (50 years)		Dixon (51 years)	
September	0	0	0	0	0	0	0	0
October	341	341	279	279	279	279	403	403
November	750	1,091	690	969	690	969	810	1,213
December	1,116	2,207	1,054	2,023	1,054	2,023	1,209	2,422
January	1,271	3,478	1,147	3,170	1,178	3,201	1,364	3,786
February	1,064	4,542	980	4,150	1,008	4,209	1,148	4,934
March	899	5,441	744	4,894	744	4,953	899	5,833
April	540	5,981	390	5,284	360	5,313	480	6,313
May	248	6,229	62	5,346	62	5,375	155	6,468
	Du Quoin (50 years)		Effingham (41 years)		Fairfield (47 years)		Flora (54 years)	
September	0	0	0	0	0	0	0	0
October	186	186	248	248	186	186	248	248
November	570	756	660	908	570	756	630	878
December	899	1,655	992	1,900	930	1,686	961	1,839
January	992	2,647	1,085	2,985	992	2,678	1,054	2,893
February	840	3,487	924	3,909	840	3,518	896	3,789
March	589	4,076	682	4,591	620	4,138	651	4,440
April	270	4,346	330	4,921	300	4,438	300	4,740
May			31	4,952			31	4,771

[a] Compiled from U. S. Dept. Commerce, Weather Bur., "Climatological Data."

TABLE 16.—*Continued*

Illinois (continued)

Month	Freeport (35 years)		Galva (49 years)		Greenville (63 years)		Griggsville (55 years)	
	M	C	M	C	M	C	M	C
September	60	60	0	0	0	0	0	0
October	434	494	341	341	248	248	248	248
November	840	1,334	780	1,121	660	908	660	908
December	1,240	2,574	1,178	2,299	992	1,900	1,023	1,931
January	1,426	4,000	1,302	3,601	1,085	2,985	1,147	3,078
February	1,176	5,176	1,120	4,721	924	3,909	980	4,058
March	961	6,137	837	5,558	682	4,591	713	4,771
April	510	6,647	450	6,008	300	4,891	330	5,101
May	186	6,833	124	6,132	31	4,922	31	5,132
	Harrisburg (42 years)		Havana (49 years)		Henry (53 years)		Hillsboro (47 years)	
September	0	0	0	0	0	0	0	0
October	155	155	270	270	341	341	248	248
November	510	665	690	960	750	1,091	630	878
December	837	1,502	1,054	2,014	1,116	2,207	992	1,870
January	930	2,432	1,178	3,192	1,271	3,478	1,085	2,955
February	784	3,216	1,008	4,200	1,148	4,626	924	3,879
March	527	3,743	744	4,944	837	5,463	682	4,561
April	240	3,983	360	5,304	420	5,883	330	4,891
May			155	5,459	93	5,976	31	4,922
	Hoopeston (38 years)		Jacksonville (48 years)		Joliet (50 years)		Kankakee (25 years)	
September	0	0	0	0	0	0	0	0
October	341	341	279	279	372	372	341	341
November	690	1,031	660	939	750	1,122	720	1,061
December	1,085	2,116	1,054	1,993	1,036	2,158	1,116	2,177
January	1,178	3,294	1,147	3,140	1,271	3,429	1,240	3,417
February	1,008	4,302	980	4,120	1,120	4,549	1,008	4,425
March	775	5,077	744	4,864	868	5,417	806	5,231
April	420	5,497	360	5,224	480	5,897	480	5,711
May	93	5,590	62	5,286	155	6,052	155	5,866
	LaHarpe (46 years)		Lincoln (53 years)		Marengo (81 years)		Mascoutah (51 years)	
September	0	0	0	0	90	90	0	0
October	310	310	310	310	465	555	217	217
November	720	1,030	690	1,000	870	1,425	630	847
December	1,116	2,146	1,054	2,054	1,271	2,696	930	1,777
January	1,209	3,355	1,178	3,232	1,426	4,122	1,023	2,800
February	1,064	4,419	1,008	4,240	1,204	5,326	868	3,668
March	806	5,225	775	5,015	1,023	6,349	620	4,288
April	420	5,645	390	5,405	570	6,919	300	4,588
May	93	5,738	62	5,467	210	7,129		

TABLE 16.—*Continued*

Illinois (continued)

Month	McLeansboro (59 years)		Minonk (47 years)		Monmouth (49 years)		Morrison (46 years)	
	M	C	M	C	M	C	M	C
September	0	0	0	0	0	0	0	0
October	186	186	341	341	341	341	372	372
November	570	756	750	1,091	750	1,091	780	1,152
December	899	1,655	1,147	2,238	1,147	2,238	1,209	2,361
January	1,023	2,678	1,271	3,509	1,302	3,540	1,204	3,565
February	840	3,518	1,092	4,601	1,092	4,632	1,148	4,713
March	620	4,138	837	5,438	806	5,438	868	5,581
April	270	4,408	450	5,888	420	5,858	480	6,061
May			93	5,981	31	5,889	120	6,181
	Mt. Carmel (39 years)		Mt. Carroll (51 years)		Mt. Vernon (46 years)		New Burnside (30 years)	
September	0	0	60	60	0	0	0	0
October	186	186	434	494	217	217	155	155
November	600	786	840	1,334	600	817	540	695
December	930	1,716	1,240	2,574	930	1,747	868	1,563
January	992	2,708	1,364	3,938	1,023	2,770	930	2,493
February	868	3,576	1,176	5,114	868	3,638	756	3,249
March	589	4,165	930	6,044	620	4,258	558	3,807
April	300	4,465	510	6,554	300	4,558	270	4,077
May			186	6,740				
	Olney (45 years)		Ottawa (53 years)		Palestine (59 years)		Pana (52 years)	
September	0	0	0	0	0	0	0	0
October	217	217	341	341	240	240	279	279
November	600	817	750	1,091	651	891	660	939
December	961	1,778	1,116	2,207	961	1,852	1,023	1,962
January	1,023	2,801	1,240	3,447	1,085	2,937	1,147	3,109
February	896	3,697	1,064	4,511	896	3,833	952	4,061
March	651	4,348	837	5,348	682	4,515	713	4,774
April	330	4,678	450	5,798	330	4,845	360	5,134
May			155	5,953	31	4,876	62	5,196
	Paris (48 years)		Peoria (86 years)		Pontiac (43 years)		Quincy (30 years)	
September	0	0	0	0	0	0	0	0
October	279	279	372	372	310	310	217	217
November	690	969	780	1,152	690	1,000	630	847
December	1,054	2,023	1,116	2,268	1,085	2,085	992	1,839
January	1,147	3,170	1,271	3,539	1,209	3,294	1,147	2,986
February	980	4,150	1,036	4,575	1,036	4,330	924	3,910
March	775	4,925	806	5,381	806	5,136	713	4,623
April	390	5,315	420	5,801	420	5,556	330	4,953
May	62	5,377	93	5,894	93	5,649		

TABLE 16.—*Continued*

Illinois (concluded), and Missouri

Month	Rockford (54 years)		Rushville (50 years)		Sparta (55 years)		Springfield (62 years)	
	M	C	M	C	M	C	M	C
September	30	30	0	0	0	0	0	0
October	403	433	279	279	186	186	279	279
November	810	1,243	720	999	570	756	690	969
December	1,209	2,452	1,054	2,053	899	1,655	1,023	1,992
January	1,364	3,816	1,178	3,231	992	2,647	1,147	3,139
February	1,176	4,992	1,008	4,239	840	3,487	980	4,119
March	930	5,922	744	4,983	589	4,076	744	4,863
April	510	6,432	360	5,343	270	4,346	360	5,223
May	186	6,618	62	5,405			62	5,285
	Sycamore (61 years)		Urbana (39 years)		Walnut (50 years)		Waukegan (19 years)	
September	60	60	30	30	0	0	30	30
October	434	494	310	340	341	341	403	433
November	840	1,334	720	1,060	780	1,121	780	1,213
December	1,209	2,543	1,085	2,145	1,178	2,299	1,147	2,360
January	1,364	3,907	1,178	3,323	1,302	3,601	1,302	3,662
February	1,176	5,083	1,008	4,331	1,120	4,721	1,092	4,754
March	961	6,044	775	5,106	868	5,589	961	5,715
April	540	6,584	450	5,556	450	6,039	600	6,315
May	217	6,801	124	5,680	90	6,129	279	6,594
	White Hall (51 years)		St. Louis, Mo. (68 years)		Hannibal, Mo. (49 years)		Louisiana, Mo. (48 years)	
September	0	0	0	0	0	0	0	0
October	279	279	186	186	248	248	279	279
November	660	939	570	756	660	908	630	909
December	1,023	1,962	899	1,655	1,023	1,931	1,023	1,932
January	1,147	3,109	1,023	2,678	1,147	3,078	1,147	3,079
February	924	4,033	840	3,518	980	4,058	952	4,031
March	713	4,746	620	4,138	713	4,771	682	4,713
April	330	5,076	270	4,408	360	5,131	330	5,043
May	31	5,107			31	5,162	31	5,074

Iowa

	Ames (48 years)		Dubuque (67 years)		Des Moines (63 years)		Davenport (70 years)	
September	30	30	30	30	0	0	0	0
October	403	433	403	433	341	341	341	341
November	840	1,273	840	1,273	810	1,151	780	1,121
December	1,271	2,544	1,240	2,513	1,209	2,360	1,147	2,268
January	1,426	3,970	1,426	3,939	1,364	3,724	1,333	3,601
February	1,204	5,174	1,176	5,115	1,148	4,872	1,120	4,721
March	899	6,073	961	6,076	868	5,740	868	5,589
April	480	6,553	480	6,556	450	6,190	450	6,039
May	155	6,708	155	6,711	43	6,233	124	6,163

TABLE 16.—*Continued*

Iowa (concluded), Nebraska, and Indiana

Month	Keokuk, Iowa (70 years)		Omaha, Neb. (69 years)		Terre Haute, Ind. (49 years)		Vincennes, Ind. (48 years)	
	M	C	M	C	M	C	M	C
September	0	0	0	0	0	0	0	0
October	279	279	310	310	248	248	217	217
November	720	999	780	1,090	630	878	600	817
December	1,085	2,084	1,147	2,237	992	1,870	930	1,747
January	1,240	3,324	1,333	3,570	1,085	2,955	1,023	2,770
February	1,008	4,332	1,092	4,662	924	3,879	896	3,666
March	806	5,138	837	5,499	682	4,561	651	4,317
April	390	5,528	420	5,919	330	4,891	300	4,617
May	62	5,590	93	6,012	31	4,922		

Minnesota

	Bemidji (23 years)		Duluth (71 years)		International Falls (24 years)		Minneapolis (51 years)	
August	0	0	31	31	62	62	0	0
September	270	270	270	301	300	362	90	90
October	620	890	620	921	713	1,075	465	555
November	1,140	2,030	1,080	2,001	1,230	2,305	960	1,515
December	1,612	3,642	1,519	3,520	1,705	4,010	1,395	2,910
January	1,891	5,533	1,705	5,225	1,922	5,932	1,612	4,522
February	1,596	7,129	1,456	6,681	1,596	7,528	1,372	5,894
March	1,333	8,462	1,271	7,952	1,395	8,923	1,085	6,979
April	750	9,212	810	8,762	780	9,703	570	7,549
May	341	9,553	527	9,289	434	10,137	217	7,766
June	60	9,613	217	9,506	93	10,230		

Minnesota (concluded), and Wisconsin

	Rochester, Minn. (31 years)		Virginia, Minn. (48 years)		Eau Claire, Wis. (51 years)		Green Bay, Wis. (55 years)	
August	0	0	31	31	0	0	0	0
September	120	120	300	331	120	120	120	120
October	527	647	682	1,013	496	616	496	616
November	960	1,607	1,170	2,183	960	1,576	900	1,516
December	1,395	3,002	1,643	3,826	1,426	3,002	1,302	2,818
January	1,705	4,707	1,829	5,655	1,581	4,583	1,519	4,337
February	1,372	6,079	1,540	7,195	1,372	5,955	1,316	5,653
March	1,116	7,195	1,302	8,497	1,085	7,040	1,116	6,769
April	600	7,795	780	9,277	570	7,610	660	7,429
May	248	8,043	403	9,680	217	7,827	310	7,739
June			90	9,770				

TABLE 16.—*Concluded*

Wisconsin (concluded)

	La Crosse (69 years)		Madison (73 years)		Milwaukee (71 years)		Stevens Point (49 years)	
	M	C	M	C	M	C	M	C
September	90	90	90	90	60	60	120	120
October	465	555	465	555	434	494	496	616
November	900	1,455	900	1,455	840	1,334	930	1,546
December	1,302	2,757	1,302	2,757	1,209	2,543	1,395	2,941
January	1,519	4,276	1,488	4,245	1,364	3,907	1,550	4,491
February	1,260	5,536	1,260	5,505	1,176	5,083	1,372	5,863
March	1,023	6,559	1,054	6,559	1,023	6,106	1,085	6,948
April	510	7,069	570	7,129	630	6,736	600	7,548
May	186	7,255	210	7,339	341	7,077	248	7,796
June					30	7,107		

Table 17 shows degree-days for 47 cities and towns of Illinois, in which those for the heating season of 1941-42 are compared with the normal average over the entire period during which records have been kept. This table indicates that the heating season of 1941-42 was milder than the normal average by differences which vary from 200 to 1100 degree-days.

TABLE 17.—DEGREE-DAYS FOR 47 ILLINOIS CITIES DURING 1941–42, BY MONTHS, COMPARED WITH NORMAL AVERAGE OVER THE PERIOD DURING WHICH RECORDS HAVE BEEN KEPT[a]

M=Monthly, 1941-42
A=Normal Average (see table 16)

Month	Aurora		Bloomington		Cairo		Carbondale	
	M	A	M	A	M	A	M	A
September	0	30	0	0	0	0	0	0
October	341	403	248	310	0	155	31	155
November	720	810	630	720	510	510	540	540
December	961	1,178	868	1,085	682	806	744	868
January	1,271	1,333	1,178	1,209	961	899	1,023	930
February	1,120	1,120	1,092	1,316	784	756	840	784
March	775	930	682	806	465	527	527	558
April	330	510	270	300	120	210	180	240
May	155	186	93	62	0	0	0	0
Total	5,673	6,500	5,061	5,808	3,522	3,863	3,885	4,075
	Carlinville		Charleston		Chicago		Danville	
October	124	248	155	279	248	341	217	279
November	600	630	600	660	660	750	630	690
December	806	992	837	992	899	1,116	868	1,054
January	1,085	1,116	1,085	1,116	1,209	1,271	1,147	1,147
February	952	924	980	952	1,064	1,064	1,036	980
March	589	682	589	713	775	899	651	744
April	210	330	210	360	330	540	270	390
May	30	31	60	93	186	248	62	62
Total	4,396	4,953	4,516	5,165	5,371	6,229	4,881	5,346
	Decatur		Dixon		Effingham		Flora	
October	186	279	310	403	155	248	93	248
November	600	690	690	810	630	660	570	630
December	837	1,054	930	1,209	868	992	775	961
January	1,116	1,178	1,302	1,364	1,116	1,085	1,054	1,054
February	1,008	1,008	1,148	1,148	980	924	924	896
March	620	744	744	899	651	682	558	651
April	240	360	300	480	270	330	210	300
May	62	62	124	155	93	31	0	31
Total	4,669	5,375	5,548	6,468	4,763	4,952	4,184	4,771
	Freeport		Galva		Greenville		Harrisburg	
September	0	60	0	0	0	0	0	0
October	341	434	248	341	93	248	0	155
November	720	840	660	780	600	660	510	510
December	1,023	1,240	930	1,178	806	992	682	837
January	1,395	1,426	1,271	1,302	1,054	1,085	992	930
February	1,176	1,176	1,120	1,120	924	924	868	784
March	806	961	744	837	589	682	465	527
April	360	510	300	450	180	300	150	240
May	186	186	124	124	0	31	0	0
Total	6,007	6,833	5,397	6,132	4,246	4,922	3,667	3,983

[a] Compiled from U. S. Dept. Commerce, Weather Bur., "Climatological Data."

TABLE 17.—*Continued*

Month	Havana		Hoopeston		Jacksonville		Joliet	
	M	A	M	A	M	A	M	A
October	217	270	248	341	155	279	310	372
November	660	690	660	690	630	660	690	750
December	899	1,054	868	1,085	837	1,054	930	1,036
January	1,178	1,178	1,178	1,178	1,116	1,147	1,240	1,271
February	1,036	1,008	1,092	1,008	1,008	980	1,120	1,120
March	682	744	713	775	620	744	775	868
April	240	360	270	420	210	360	330	480
May	62	155	62	93	62	62	124	155
Total	4,974	5,459	5,091	5,590	4,638	5,286	5,519	6,052
	Kankakee		LaHarpe		Lincoln		McLeansboro	
October	248	341	217	310	217	310	31	186
November	660	720	660	720	630	690	570	570
December	899	1,116	868	1,116	837	1,054	806	899
January	1,178	1,240	1,209	1,209	1,147	1,178	1,023	1,023
February	1,064	1,008	1,064	1,064	1,036	1,008	868	840
March	713	806	682	806	651	775	496	620
April	300	480	270	420	240	390	180	270
May	93	155	93	93	62	62	0	0
Total	5,155	5,866	5,063	5,738	4,820	5,467	3,974	4,408
	Marengo		Mascoutah		Minonk		Monmouth	
September	0	90	0	0	0	0	0	0
October	372	465	62	217	279	341	248	341
November	720	870	540	630	660	750	660	750
December	992	1,271	744	930	930	1,147	899	1,147
January	1,364	1,426	992	1,023	1,240	1,271	1,240	1,302
February	1,204	1,204	840	868	1,120	1,092	1,092	1,092
March	837	1,023	496	620	744	837	713	806
April	360	570	210	300	300	450	270	420
May	217	210	0	0	124	93	124	31
Total	6,066	7,129	3,884	4,588	5,397	5,981	5,246	5,889
	Mount Carmel		Mount Carroll		Mount Vernon		New Burnside	
September	0	0	0	60	0	0	0	0
October	62	186	341	434	62	217	31	155
November	540	600	720	840	600	600	540	540
December	713	930	992	1,240	775	930	713	868
January	1,023	992	1,364	1,364	1,054	1,023	1,023	930
February	868	868	1,148	1,176	896	868	868	756
March	496	589	775	930	496	620	527	558
April	150	300	330	510	150	300	180	270
May	0	0	186	186	0	0	0	0
Total	3,852	4,465	5,856	6,740	4,033	4,558	3,882	4,077

TABLE 17.—*Concluded*

Month	Palestine		Pana		Paris		Peoria	
	M	A	M	A	M	A	M	A
October	124	240	124	279	155	279	217	372
November	600	651	600	660	600	690	660	780
December	806	961	837	1,023	837	1,054	868	1,116
January	1,085	1,085	1,085	1,147	1,116	1,147	1,209	1,271
February	952	896	980	952	1,008	980	1,064	1,036
March	589	682	589	713	620	775	713	806
April	210	330	240	360	210	390	270	420
May	0	31	31	62	0	62	93	93
Total	4,366	4,876	4,486	5,196	4,546	5,377	5,094	5,894
	Pontiac		Quincy		Rockford		Rushville	
September	0	0	0	0	0	30	0	0
October	217	310	186	217	310	403	217	279
November	630	690	630	630	690	810	660	720
December	868	1,085	837	992	961	1,209	868	1,054
January	1,147	1,209	1,116	1,147	1,333	1,364	1,178	1,178
February	1,064	1,036	980	924	1,148	1,176	1,036	1,008
March	682	806	620	713	775	930	713	744
April	240	420	210	330	300	510	270	360
May	62	93	62	0	155	186	93	62
Total	4,910	5,649	4,641	4,953	5,672	6,618	5,035	5,405
	Sparta		Springfield		Sycamore		Urbana	
September	0	0	0	0	0	60	0	30
October	31	186	186	279	372	434	186	310
November	540	570	690	690	720	840	630	720
December	744	899	868	1,023	992	1,209	868	1,085
January	992	992	1,116	1,147	1,333	1,364	1,147	1,178
February	840	840	1,036	980	1,176	1,176	1,064	1,008
March	465	589	651	744	806	961	682	775
April	150	270	210	360	360	540	270	450
May	0	0	31	62	155	217	93	124
Total	3,762	4,346	4,788	5,285	5,914	6,801	4,940	5,680
	Walnut		Waukegan		White Hall			
September	0	0	0	30	0	0		
October	279	341	341	403	124	279		
November	690	780	660	780	630	660		
December	930	1,178	961	1,147	806	1,023		
January	1,271	1,302	1,302	1,302	1,085	1,147		
February	1,120	1,120	1,120	1,092	952	924		
March	744	868	837	961	620	713		
April	270	450	420	600	210	330		
May	124	90	217	279	31	31		
Total	5,428	6,129	5,858	6,594	4,458	5,107		

Fuel Briquets and Packaged Fuel

Production of fuel briquets, to utilize coal screenings in domestic and other fuel markets, is steadily increasing in importance. Table 18 gives the shipments of fuel briquets of domestic manufacture into the Illinois coal market area for 1940 and 1941. This shows that the use of such briquets in Illinois during 1941 amounted to 50,398 tons, which was an increase of 58 per cent over 1940.

In Illinois the production of fuel briquets is increasing, due especially to their manufacture from deduster dust, which is a byproduct obtained in the preparation of stoker fuel from Southern Illinois coal. It is impossible to publish data on this without revealing operations of individual concerns.

Research in briquetting Illinois coals has been carried on for several years by the Illinois Geological Survey. This is now proceeding with the use of a commercial-size press specially designed for the manufacture of briquets without the use of added material for a binder.

Production of packaged fuel in Illinois also increased in 1941. This material differs from fuel briquets in that the blocks are not so firmly compressed and are wrapped to withstand weathering and breakage in shipment. Table 19 gives the production of packaged fuel in Illinois for the past four years. That for 1941 was valued at $95,431, which was 2.6 times the value for 1940.

Table 18.—Shipments of Fuel Briquets of Domestic Manufacture into the Illinois Coal Market Area, 1940–41[a]
(In net tons)

Destination	1940	1941
Illinois	31,895	50,398
Indiana	25,946	45,934
Iowa	25,509	31,608
Kansas	5,145	4,957
Kentucky	5,635	5,734
Minnesota	217,068	244,767
Missouri	16,738	82,954
Nebraska	25,371	23,992
North Dakota	66,114	80,136
South Dakota	60,723	64,026
Wisconsin	230,840	220,939
Total	710,984	855,445

[a] U. S. Dept. Int., Bituminous Coal Div., Weekly Coal Report Supplement, No. WACR 256.

Table 19.—Production and Value of Packaged Fuel in Illinois, 1938–1941[a]

Year	Production			No. Plants
	Tons	Value	Average	
1938	4,133	$42,555	$10.30	5
1939	3,998	40,487	10.10	5
1940	3,813	36,531	9.60	6
1941	8,924	95,431	10.60	6

[a] U. S. Bur. Mines, Minerals Yearbooks.
U. S. Dept. Int., Bituminous Coal Div., Weekly Coal Report Supplement, No. WACR 256.

TABLE 20.—PRODUCTION OF COKE AND BYPRODUCTS IN ILLINOIS, 1939–1941[a]

	1939			1940			1941		
	Amount	Value at Ovens		Amount	Value at Ovens		Amount	Value at Ovens	
		Total (Thous.)	Average		Total (Thous.)	Average		Total (Thous.)	Average
Byproduct coke (Thousands of tons)	1,884	$11,964	$6.35 (per ton)	3,015	$18,218	$6.04 (per ton)	3,661	$25,215	$6.89 (per ton)
Coke breeze (Thousands of tons)	196	486	2.47 (per ton)	253	577	2.27 (per ton)	326	782	2.40 (per ton)
Byproducts:									
Ammonia (sulfate sold) (Thousands of pounds)	32,652	342	0.01 (per lb.)	69,203	785	0.01 (per lb.)	74,550	889	0.01 (per lb.)
Coke-oven tar (sold or used—thousands of gallons)	21,020	1,002	0.05 (per gal.)	33,285	1,478	0.04 (per gal.)	31,576	1,449	0.05 (per gal.)
Coke-oven gas (sold or used—millions of cubic feet)	20,640	4,740	0.23 (per M. cu. ft.)	28,613	5,393	0.19 (per M. cu. ft.)	34,302	5,320	0.15 (per M. (cu. ft.)
Light oil and derivatives (sold—thousands of gallons)	1,421	195	0.14 (per gal.)	4,121	500	0,12 (per gal.)	[b]	[b]	[b]
Total value (Thousands of dollars)		$18,729			$26,951			$33,655	
Number of plants		9			9			[b]	
Number of ovens		916			916			[b]	
Yield (per cent of coal):									
Coke		68.1			70.6			[b]	
Coke breeze		7.1			5.9			[b]	

[a] U. S. Bur. Mines, Minerals Yearbooks and Monthly Coke Report No. MCR 169.
[b] Not available, due to war censorship.

Coke and Byproducts

Coke is used so extensively in the iron and steel industry that the great increase in this industry caused by military preparations during 1941 was reflected immediately in the coke industry. Production of coke and its byproducts in Illinois during the past three years is given in table 20. During 1941 their value amounted to $33,655,000, not including some byproducts, information on which is restricted by war censorship.

All of the coke produced in Illinois is made in byproduct ovens. Over half of the coal used in making this coke is mined in West Virginia, the rest comes from Kentucky, Pennsylvania, Illinois, Indiana, Tennessee, and Virginia. Coke is made from Illinois coal in Curran-Knowles ovens located at West Frankfort and Millstadt.

Consumption of coke in states in the Illinois coal market area, by principal uses, is given in table 21. At the bottom of this table is given the distribution of coke produced in Illinois.

PETROLEUM

For the third successive year petroleum has been the leading mineral product in Illinois in dollar value. The 1941 production of crude oil amounted to 134,138,000 barrels valued at approximately $174,380,000. This does not include the value of natural gas, natural gasoline, and liquefied gas produced in Illinois in 1941, which brings the total value to more than $179,500,000. Illinois ranked fourth in the United States in production of crude oil in 1941, being surpassed only by Texas, California, and Oklahoma, and it produced 9.6 per cent of the total for the nation.

Production

General statistics of the petroleum industry in Illinois are presented in table 22, giving the production and value of crude oil, natural gas, natural gasoline, and liquefied gases (butane and propane) for 1939, 1940, and 1941. The value for 1941 established an all-time high record, showing an increase of 10 per cent over that for 1940 and an increase of 76 per cent over that for 1939.

Crude-oil production in the United States is shown in table 23 by districts and states for the years 1936 to 1941, inclusive, for comparison with that of Illinois. The data are presented graphically in figure 6. Illinois production has been the principal factor in the rapid increase for the Central district, which has enjoyed a much greater increase than any other district since 1937.

Prices and average value of Illinois crude oil are given in tables 24 and 25.

Supply and Demand

Supply of oils from all sources in the United States for 1939, 1940, and 1941 is shown in table 26. The principal source is domestic crude oil, with natural gasoline recovered from natural gas, and benzol from coke-oven plants. Data on imports and exports are available only for the first nine months of 1941, because of war censorship.

Relationship of supply and demand, as reflected in changes in stocks of crude oil in Illinois and certain refined products in the Central refining district, in comparison with stocks of crude oil and gasoline in the United States, are shown in table 27.

Data on consumption of refined products and proved reserves of petroleum are not available because of war censorship.

TABLE 21.—SUMMARY OF BYPRODUCT AND BEEHIVE COKE AND BREEZE CONSUMED IN STATES IN THE ILLINOIS COAL MARKET AREA IN 1941, (IN NET TONS)[a]

Consuming state	Coke							Coke Breeze
	Furnace use	Foundry use	Making producer gas	Making water gas	Other industrial use	Domestic use	Total coke	
Illinois	4,369,826	241,538	28,119	31,749	115,447	615,516	5,402,195	304,686
Indiana	5,231,850	145,936	.....	31,828	162,184	240,598	5,812,396	408,901
Iowa	.....	52,074	.....	6,981	28,440	8,657	96,152	5,342
Minnesota	282,693	24,764	4,165	.....	24,908	304,129	640,659	51,153
Missouri	121	51,836	.....	206	72,778	136,286	261,227	2,615
Wisconsin	30	139,350	59,858	34,595	15,745	381,350	630,928	90,301
1941 Total	9,884,520	655,498	92,142	105,359	419,502	1,686,536	12,843,557	862,998
1940 Total	7,882,259	461,676	96,642	129,644	324,063	2,108,867	11,003,151	782,939
Distribution of coke produced in Illinois, 1941	2,423,455	351,685	[b]	[b]	151,776	733,962	3,660,878	326,085

[a] From "Distribution of Byproduct and Beehive Coke in 1941," U. S. Bur. Mines, MMS 1015, August, 1942.
[b] Not differentiated.

TABLE 22.—PRODUCTION AND VALUE OF CRUDE OIL AND RELATED PRODUCTS IN ILLINOIS, 1939–1941[a]

	1939			1940			1941		
	Production	Value at wells	Average	Production	Value at wells	Average	Production	Value at wells	Average
Crude oil (bbls.)	94,912,000	$101,200,000	$1.07	147,647,000	$160,900,000	$1.09	134,138,000	$174,380,000	$1.30
Natural gas[b] (M. cu. ft.):									
Marketed as gas	977,338	31,200	.032	1,165,328	31,500	.027	1,699,400	51,000	.03
Used at wells[c]	6,085,000	194,000	.032	8,185,000	221,000	.027	10,060,000	301,800	.03
	7,062,338	225,200	.032	9,350,328	252,500	.027	11,759,400	352,800	.03
Natural gasoline (gals.)	4,012,000	228,900	.057	21,432,000	1,122,000	.052	93,165,000	3,747,000	.04
Liquefied petroleum gases:									
Butane (gals.)	—			—			25,700,000	707,000	.0275
Propane (gals.)	—			—			12,593,000	347,000	
							38,293,000	1,054,000	.0275
Total value		$101,654,100			$162,274,500			$179,533,800	

[a] U. S. Bur. Mines, Minerals Yearbooks and Monthly Petroleum Statements.
[b] Illinois Geol. Survey, Illinois Petroleum Series.
[c] Calculated at estimated rate of 500 cu. ft. per day per well for fields discovered prior to Jan. 1, 1937.
Calculated at estimated rate of 2 M cu. ft. per day per well for fields discovered after Jan. 1, 1937.

TABLE 23.—CRUDE OIL PRODUCTION IN THE UNITED STATES, BY DISTRICTS AND STATES, 1936–1941[a]
(In thousands of barrels)

Districts and States	1936		1937		1938		1939		1940		1941[b]	
	Quantity	Per cent	Quantity	Per cent	Quantity	Per cent	Quantity	Per cent	Quantity	Per cent	Quantity	Per cent
Midcontinent:												
Arkansas	10,469		11,764		18,180		21,238		25,775		26,327	
North Louisiana	26,917		28,883		28,578		25,403		24,406		25,354	
Kansas	58,317		70,761		60,064		60,703		66,139		83,261	
New Mexico	27,223		38,854		35,759		37,637		39,129		39,369	
Oklahoma	206,555		228,839		174,994		159,913		156,164		154,759	
Texas (except Gulf)	340,423		395,616		360,263		361,005		371,043		372,445	
Total	669,904	*61.0*[c]	774,717	*60.6*[c]	677,838	*55.8*[c]	665,899	*52.6*[c]	682,656	*50.5*[c]	701,515	*49.9*[c]
California:												
California	214,773		238,521		249,749		224,354		223,881		230,263	
Total	214,773	*19.5*	238,521	*18.6*	249,749	*20.6*	224,354	*17.7*	223,881	*16.5*	230,263	*16.4*
Gulf Coast:												
Louisiana Gulf	53,574		62,041		66,630		68,243		79,178		90,554	
Texas Gulf	86,988		114,702		115,587		122,523		122,166		135,139	
Mississippi	(d)		(d)		(e)		107		4,400		15,314	
Total	140,562	*12.8*	176,743	*13.8*	182,217	*15.0*	190,873	*15.1*	205,744	*15.2*	241,007	*17.2*
Rocky Mountain:												
Colorado	1,650		1,605		1,412		1,404		1,626		1,875	
Montana	5,868		5,805		4,946		5,960		6,728		7,526	
Wyoming	14,582		19,166		19,022		21,454		25,711		29,694	
Total	22,100	*2.0*	26,576	*2.1*	25,380	*2.1*	28,818	*2.3*	34,065	*2.5*	39,095	*2.8*

Central:												
Illinois	4,475		7,499		24,075		94,912		147,647		134,138	
Indiana	822		844		995		1,711		4,978		6,634	
Kentucky	5,633		5,484		5,821		5,621		5,188		4,762	
Ohio	3,847		3,559		3,298		3,156		3,159		3,340	
Michigan	11,928		16,628		18,745		23,462		19,753		16,361	
Total	26,705	*2.4*	34,014	*2.7*	52,934	*4.4*	128,862	*10.2*	180,725	*13.3*	165,235	*11.8*
Eastern:												
Pennsylvania	17,070		19,189		17,426		17,382		17,353		16,750	
New York	4,663		5,478		5,045		5,098		4,999		5,185	
West Virginia	3,847		3,845		3,684		3,580		3,444		3,433	
Total	25,580	*2.3*	28,512	*2.2*	26,155	*2.1*	26,060	*2.1*	25,796	*2.0*	25,368	*1.8*
Other [f]:	63	—	77	—	82	—	96	—	347	—	1,699	*0.1*
Total United States	1,099,687	*100.0*	1,279,160	*100.0*	1,214,355	*100.0*	1,264,962	*100.0*	1,353,214	*100.0*	1,404,182	*100.0*
Illinois	4,475	*0.4*	7,499	*0.6*	24,075	*2.0*	94,912	*7.5*	147,647	*10.9*	134,138	*9.6*

[a] U. S. Bur. Mines, Minerals Yearbooks and Monthly Petroleum Statements.
[b] Subject to revision.
[c] Per cent of total U. S. production.
[d] No commercial production.
[e] Included in "Other."
[f] The states reporting are not identical from year to year.

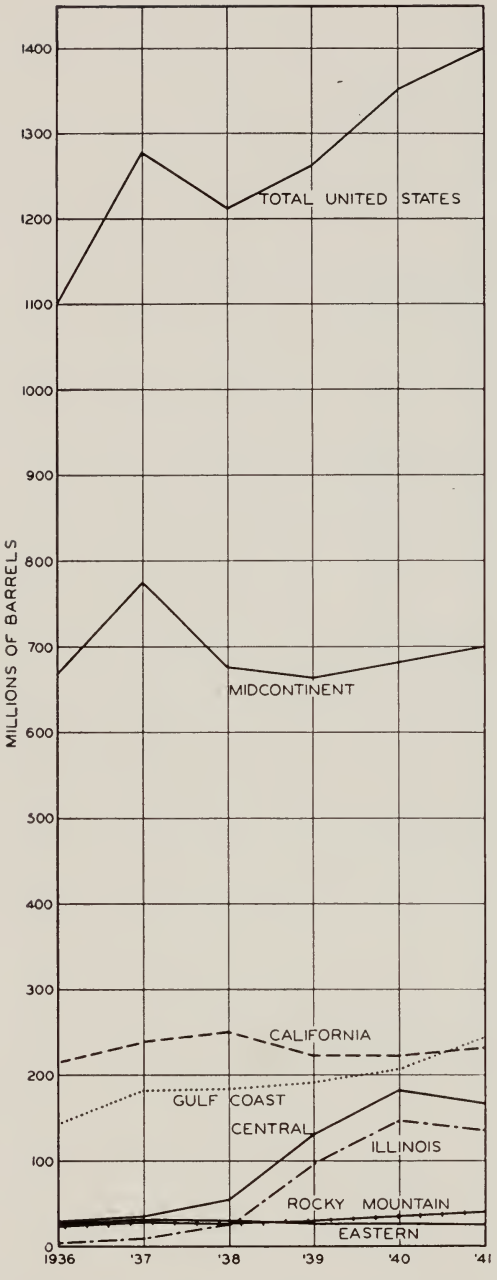

FIG. 6.—Crude oil production in the United States by districts and in Illinois, 1936-41.

TABLE 24.—PRICES OF ILLINOIS CRUDE OIL IN 1941[a]
(Per barrel at wells)

1941	Old fields	Central basin, Salem and Griffin areas
April 1st	$1.05	$1.20
April 28th	1.12	1.27
May 21st	1.22	1.37
December 31st	1.22	1.37

[a] Illinois Geol. Survey, Illinois Petroleum No. 41, Sept. 12, 1942.

TABLE 25.—AVERAGE VALUE OF CRUDE OIL IN ILLINOIS, 1936–1941[a]
(Per barrel at wells)

1936	$1.20
1937	1.33
1938	1.25
1939	1.07
1940	1.09
1941	1.30[b]

[a] U. S. Bur. Mines, Minerals Yearbooks.
[b] Illinois Geol. Survey, Illinois Petroleum No. 41, Sept. 12, 1942.

TABLE 26.—SUPPLY OF OILS FROM ALL SOURCES IN THE UNITED STATES, 1939, 1940 and 1941[a]
(In thousands of barrels)

	1939	1940	1941
Domestic production:			
Crude petroleum	1,264,962	1,353,214	1,404,182
Natural gasoline	51,650	55,700	64,204
Benzol	2,498	3,167	3,469
Imports:			
Crude petroleum for domestic use	28,447	42,662	36,334[b]
Refined products for domestic use	7,298	41,089	30,697[b]
Gross total, new supply	1,354,855	1,495,832	1,538,886
Less exports of:			
Crude petroleum	72,076	51,496	25,619[b]
Refined products	116,883	78,970	49,618[b]
Net new domestic supply	1,165,896	1,365,366	1,463,649[c]

[a] U. S. Bur. Mines, Monthly Petroleum Statements.
[b] Figures for Jan.-Sept., 1941 only. Subsequent publication suspended, due to war censorship.
[c] Exclusive of import and export figures for October, November, and December, 1941, which are not available.

TABLE 27.—STOCKS OF CRUDE OIL AND REFINED PRODUCTS IN THE UNITED STATES, IN ILLINOIS, AND IN THE CENTRAL REFINING DISTRICT, BY MONTHS, 1941[a]
(In thousands of barrels)

1941	Total crude stocks		Stocks of refined products			
			Central refining district			United States
	U. S.	Illinois	Gasoline	Distillate fuel oil[b]	Residual fuel oil[b]	Gasoline
January	263,251	14,266	18,007	3,542	2,827	90,366
February	264,432	14,557	19,923	2,801	2,939	95,646
March	266,380	14,221	20,782	2,397	2,801	98,922
April	266,012	14,475	19,368	2,531	3,068	95,931
May	262,111	13,606	17,846	3,079	3,460	92,968
June	259,075	13,402	17,786	3,774	3,568	89,842
July	255,378	14,066	16,669	4,762	3,740	84,701
August	249,620	14,356	15,424	5,520	4,158	80,377
September	246,111	13,068	15,430	6,058	4,468	79,963
October	243,735	13,019	15,996	6,178	4,643	82,303
November	243,679	12,198	16,793	5,847	4,465	87,278
December	246,884	12,748	18,327	5,552	4,152	94,098

[a] U. S. Bur. Mines, Monthly Petroleum Statements.
[b] Includes refinery and bulk stocks.

Natural and Manufactured Gas

Large quantities of natural gas are produced from the oil fields of Illinois, but equipment for collecting and transporting this gas requires heavy investment and is not yet available in many localities. Part of the gas is treated to produce natural gasoline and liquefied gases, and part is used to repressure oil wells to increase their production. The production and value of natural gas which is marketed as such, and that used at wells, for pumping, lighting, heating, and treating oil, is shown in table 22.

Natural gas from other states in the Central district and from the Midcontinent district is available in some parts of Illinois through pipelines. Consumption of natural gas in Illinois from these various sources is shown in table 28, the larger portion coming from Texas and Louisiana.

Table 28.—Consumption of Natural Gas in Illinois, with Sources, 1935–1940[a]

(In millions of cubic feet)

Year	Illinois	Indiana	Kentucky	Louisiana	Kansas	Missouri	Oklahoma	Texas	Total
1935	1,445	34	110	13,574	2,107	163	0	39,886	57,319
1936	862	95	89	17,214	2,385	53	18	51,800	72,516
1937	1,040	13	185	17,367	2,973	34	81	56,957	78,650
1938	1,068	42	135	15,168	2,176	140	89	47,682	66,500
1939	1,816	5	0	17,413	2,455	40	80	55,325	77,134
1940	7,530	7	0	17,917	2,855	18	66	59,695	88,088

[a] U. S. Bureau of Mines, Minerals Yearbooks.

Table 29.—Gas Sales to Ultimate Consumers in Illinois, by Principal Uses, 1937–1941[a, b]

(In thousands of therms)

	1937	1938	1939	1940	1941
Residential sales, exclusive of space heating	171,318	172,517	170,541	176,266	176,357
Residential space heating	85,458	79,098	88,901	107,312	105,521
Industrial-interruptible sales	383,463	323,439	383,406	377,970	378,658
Commercial, industrial—noninterruptible, and other sales	130,092	124,722	132,289	148,441	172,812
Total	770,331	699,776	775,137	809,989	833,348

[a] Illinois Commerce Commission, Rates and Research Section, Monthly Summaries of Gas Sales in Illinois, 1941, and Research Bulletins.
[b] Includes manufactured gas.

Before natural gas was available in Illinois, the larger communities were supplied by utility companies with manufactured gas, such as coal gas, coke-oven gas, and water gas. When natural gas was first piped into Illinois, some of the utility companies began furnishing a combination of natural and manufactured gas. With increased volume of natural gas available and dependability of supply demonstrated, many utilities are now supplying all natural gas.

Gas is sold on the basis of fuel value, which is stated in therms. A therm is equal to 100,000 British thermal units, so one ton of coal having an average heat value of 12,500 Btu per pound is equivalent in fuel value to 250 therms of gas. Heat value of gas available in Illinois ranges from 480 Btu per cu. ft. for manufactured gas to as high as 1030 Btu for natural gas.

Gas sales to ultimate consumers in Illinois, showing principal uses by years from 1937 to 1941, inclusive, are shown in table 29. Sales by months during 1941 are shown in table 30. Seasonal variation in demand for residential space heating has been largely offset by increased demand for industrial-interruptible and other kinds of service, giving a reasonably uniform load throughout the year.

Table 30.—Gas Sales to Ultimate Consumers in Illinois, by Uses and by Months, in 1941[a, b]
(In thousands of therms)

Month	Residential sales, exclusive of space heating	Residential space heating	Industrial interruptible sales	Commercial, industrial noninterruptible, and other sales	Total
January	15,335	16,559	27,860	12,457	72,212
February	14,443	17,467	25,560	12,606	70,076
March	14,513	17,194	28,955	12,924	73,586
April	14,511	12,187	30,403	17,092	74,193
May	15,310	5,696	34,333	15,455	70,794
June	15,446	3,183	34,503	15,285	68,416
July	14,070	1,778	37,161	14,521	67,531
August	13,005	1,378	35,835	14,383	64,601
September	14,259	1,601	31,605	15,250	62,715
October	15,300	3,872	32,090	16,612	67,873
November	15,054	10,245	30,648	12,593	68,540
December	15,111	14,361	29,705	13,634	72,811
Total	176,357	105,521	378,658	172,812	833,348

[a] "Monthly Summary of Gas Sales in Illinois," Illinois Commerce Commission, 1941.
[b] Includes manufactured gas.

Natural Gasoline and Liquefied Petroleum Gases

Production of natural gasoline in Illinois has made tremendous increases during the past two years, due to the large volume of natural gas available for processing and to increase in number and capacity of plants. The production and value for the past three years is shown in table 22. The volume of production for 1941 was 93,165,000 gallons, valued at $3,747,000. This was an increase in value of 3⅓ times that for 1940 and 16⅓ times that for 1939.

Production of liquefied petroleum gases, butane and propane, as shown in table 22, is now carried on at plants in the Louden and Salem fields. Their use as fuel for internal-combustion engines, as well as for chemical, domestic, and industrial fuel uses, is steadily increasing their importance. From butane is derived butadiene, the basic raw material for the production of Buna synthetic rubber (U. S. Bur. Mines, Minerals Yearbook 1940, p. 979).

TABLE 31.—LIMESTONE AND DOLOMITE SOLD OR USED BY PRODUCERS IN ILLINOIS, 1939, 1940 AND 1941[a]

Use	1939			1940			1941		
	Tons	Value at quarry		Tons	Value at quarry		Tons	Value at quarry	
		Total	Average		Total	Average		Total	Average
Dimension stone:									
Rough building stone	164,400	$191,979	$1.16	2,530	$ 14,957	$5.91	5,483	$ 23,516	$4.27
Rubble	2,080	2,884	1.38	20,930	33,105	1.58	1,676	2,245	1.34
Flagging	1,820	12,234	6.72	1,440	4,129	2.86	355	1,463	4.12
Total	168,300	207,097	1.22	24,900	52,191	2.10	7,514	27,224	3.62
Crushed, broken, and pulverized stone:									
Concrete and paving	5,965,470	5,409,074	0.91	5,660,360	4,229,303	0.75	7,752,335	6,822,282	0.88
Railroad ballast	239,220	161,044	0.67	359,540	234,056	0.65	529,329	385,961	0.73
Riprap	115,160	104,099	0.90	366,210	354,600	0.97	156,693	166,408	1.06
Agricultural[b]	1,453,852	1,279,800	0.87	2,284,529	1,931,700	0.84	2,994,461	2,789,470	0.93
Metallurgical and flux	317,790	311,580	0.97	567,350	572,515	1.01	563,989	532,874	0.94
Whiting substitute	7,410	27,557	3.72	8,780	39,657	4.52	33,240	91,876	2.76
Asphalt filler	11,060	29,424	2.65	59,970	168,532	2.82	66,770	157,872	2.37
Other fillers[c]	23,580	73,189	3.10	3,820	11,811	3.10	5,200	17,735	3.40
Other uses[d]	67,360	93,764	1.38	151,910	157,114	1.04	96,605	112,402	1.16
Total	8,200,902	7,489,531	0.91	9,462,469	7,699,288	0.81	12,198,622	11,076,880	0.91
Grand total	8,369,202	$7,696,628	$0.92	9,487,369	$7,751,479	$0.82	12,206,136	$11,104,104	$0.91
Commercial operations	5,653,820	4,468,185	0.79	8,309,175	6,656,506	0.80	10,654,481	9,171,241	0.86
Government-and-contractor operations[e]	2,715,382	3,228,443	1.19	1,178,194	1,094,973	0.93	1,551,655	1,932,863	1.24
20-year average, 1920-39, incl.	7,063,250	$6,111,498	$0.87						

[a] Canvass by Illinois Geol. Survey in cooperation with U. S. Bur. Mines.
[b] Canvass by Illinois Geol. Survey.
[c] Includes stone for coal-mine dusting.
[d] Includes stone for glass factories, stone sand, filter beds, mineral (rock) wool, and other crushed stone.
[e] Cost of transportation to jobs included in value of some paving and riprap stone, in government-and-contractor operations.

LIMESTONE AND DOLOMITE

The production of limestone and dolomite in Illinois increased greatly during 1941. Table 31 gives the quantity and value (at quarries) of the limestone and dolomite sold or used by Illinois producers in 1939, 1940, and 1941, excluding that used for the manufacture of cement and lime which is considered in the section of this report dealing with those industries. The production of limestone and dolomite for 1941 amounted to more than 12,200,000 tons and was valued at more than $11,100,000. This establishes an all-time record, as shown on figure 7, and represents an increase of 28 per cent in tonnage and 43 per cent in value over 1940, and an increase of 73 per cent in tonnage and 82 per cent in value over the 20-year average for the period 1920 to 1939, inclusive. Illinois now ranks third among all states in the value of stone sold or used by producers, being surpassed only by Pennsylvania and Ohio.

Dimension stone production in Illinois in 1941 declined from that of the previous year due to curtailment of private and public use in construction because of defense and war preparations.

Crushed, broken and pulverized stone production increased sharply. The value of stone for concrete and paving was 62 per cent more than that for 1940, agricultural limestone increased 44 per cent, and railroad ballast 65 per cent. These large increases in production were caused by a greatly enlarged demand from government, industry, railroads, and agriculture, and resulted from defense preparations and the need for high agricultural production.

Commercial and government-and-contractor operations.—About 1,500,000 tons of Illinois 1941 stone production came from government-and-contractor (formerly designated as "noncommercial") operations: The State of Illinois, counties, townships, municipalities, and the Work Projects Administration, produced either by themselves or by contractors expressly for their consumption. Purchases by government agencies from commercial producers are included in commercial operations. The government-and-contractor operations in 1941 were 13 per cent of the total tonnage produced.

Agricultural limestone.—A new record was established in Illinois in 1941 for agricultural limestone used. Over three million tons were used throughout the State, every county participating. This is evidence of the growing recognition of the importance of preserving and increasing the fertility of the soils, and it is to be expected that this point of view will be emphasized even more by agriculturalists, especially during the present war when greater quantities of foodstuffs must be raised.

This use of limestone to build up the soils of Illinois to new capacities of productiveness has been aided by various State and Federal agencies and farm organizations. It has been especially promoted by the conservation program of the Agricultural Adjustment Administration of the U. S. Department of Agriculture. Through this program farmers are enabled to use part of the allowance they receive for participation in its cooperative planning to secure limestone and other soil-building material to improve their land. They are encouraged to do this not only in the spring but throughout the year, and are given expert advice in the scientific application of this material to secure the maximum benefits from its use.

The widespread use of agricultural limestone on the farms of Illinois is further aided by the high-quality deposits of limestone suitable for this use within the State and adjacent to the State. The agricultural limestone resources of Illinois have been studied over a period of years by the State Geological Survey, and the information obtained has been utilized in developing additional quarries in areas where needed.

During 1941, agricultural limestone was produced in 50 of the 102 counties of the State. Of the total amount used during the year, 97 per cent was produced in Illinois.

Increase in the use of agricultural limestone during 1941 was especially pronounced in the southern counties of the State, where formerly its use has been less extensive. Increased use in the central part of the State, where the proportion of tenant-operated farms is largest, is due to provisions in the soil conservation program for division of benefits among owners and tenants.

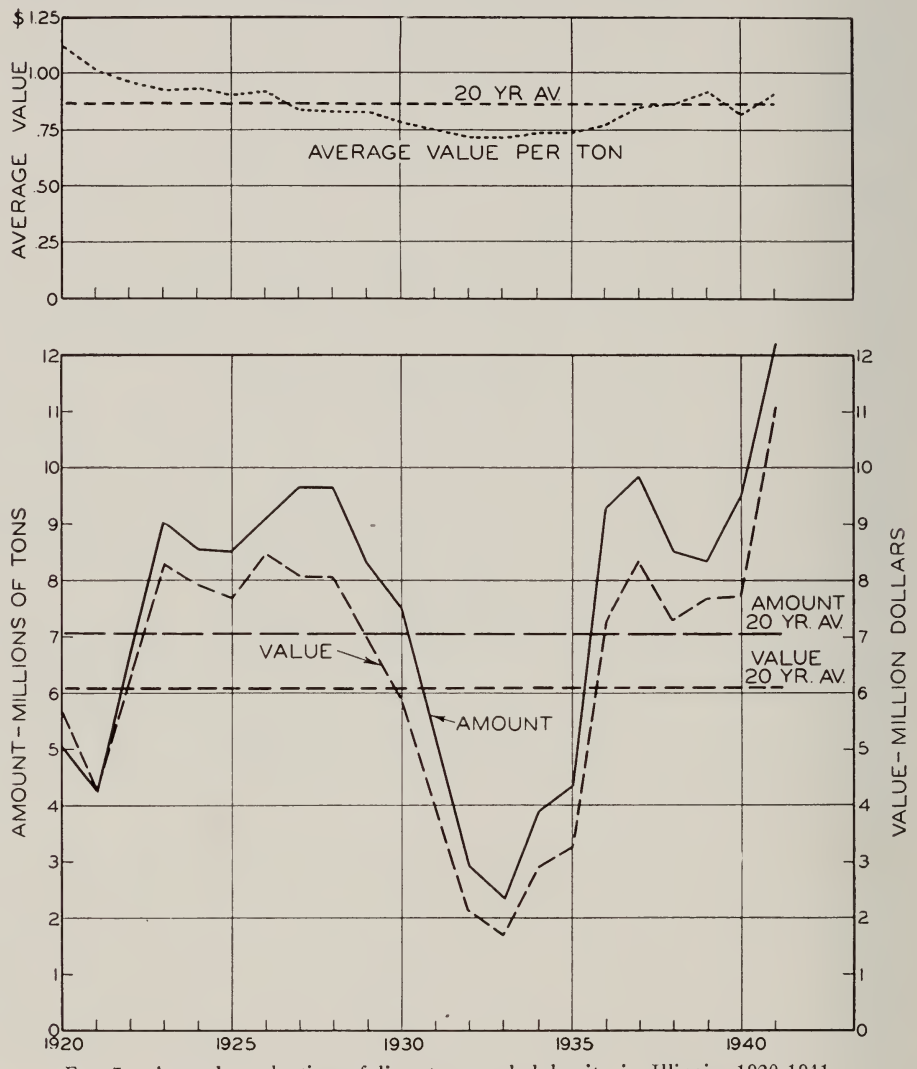

Fig. 7.—Annual production of limestone and dolomite in Illinois, 1920-1941.

Limsetone in the soil conservation program.—Among the fundamental purposes of the agricultural conservation program for 1942, the first is "to save the soil and its fertility, and to increase the production of the commodities needed for national defense."[1] The program, according to the published instructions,

[1] 1942 Agricultural Conservation Program for the North Central Region, U. S. Dept. Agr., Agricultural Adjustment Administration, NCR 601.

provides for payments to farmers to help them pay at least part of the cost of carrying out these purposes by diverting acreage from soil-depleting crops and by adopting soil-building practices.

The program provides that a soil-building allowance for carrying out approved soil-building practices will be paid at the rate of:

"(a) *70 cents* per acre of cropland in the farm in excess of the special crop acreages for which payments are computed;

"(b) *$2.00* per acre of commercial orchards on the farm;

"(c) a county flat rate per acre of noncrop open pastureland in the farm, plus *90 cents* for each animal unit of grazing capacity;

"(d) *$1.00* for each acre of commercial vegetables normally grown on the farm.

"Application of ground limestone and other approved fertilizer materials to old stands or to new seedings of biennial or perennial legumes, perennial grasses, etc., will qualify as soil-building practice.

"The ground limestone must contain calcium and magnesium carbonates equivalent to not less than 80 per cent of calcium carbonate. It must not be coarser than that obtained by grinding calcareous or dolomitic limestone, with all finer particles obtained in the grinding process included, so that (1) not less than 90 per cent will pass through an 8-mesh sieve; or (2) not less than 80 per cent will pass through an 8-mesh sieve and the multiplication of the percentage of calcium carbonate (equivalent) times the percentage of ground limestone that will pass through an 8-mesh sieve equals not less than 0.7200.

"The application of one ton of ground limestone in the following counties, $2.00 per ton:

Knox	Macon	Clinton	Hamilton
Stark	Greene	Marion	White
Peoria	Macoupin	Clay	Jackson
Fulton	Montgomery	Richland	Williamson
Schuyler	Christian	Lawrence	Saline
Brown	Shelby	Washington	Gallatin
Cass	Moultrie	Jefferson	Union
Mason	Bond	Wayne	Johnson
Menard	Fayette	Edwards	Pope-Hardin
Sangamon	Effingham	Wabash	Alexander-Pulaski
Scott	Jasper	Perry	Massac
Morgan	Crawford	Franklin	

"The application of one ton of ground limestone in all other counties, $1.50 per ton."

Table 32 gives the use of agricultural limestone in Illinois by counties in 1941, showing also what portion of the tonnage used was produced in Illinois and what in other states, the arable land in each county, and the average number of pounds of limestone used per acre of arable land. These data are from reports of producers, supplemented by information from farm advisers. Corresponding figures are given for 1940 for total amounts used and pounds per acre.

Table 33 gives the total amount of agricultural limestone produced in other states which was used in Illinois, and its proportion to the total used in Illinois, for the past seven years.

Table 34 gives the total amount of agricultural limestone produced in Illinois which was marketed in other states for the past seven years.

Table 35 summarizes the disposition and value of agricultural limestone produced in Illinois for 1939, 1940, and 1941.

The map, figure 8, shows Illinois counties and their average consumption of agricultural limestone per acre of arable land in 1941.

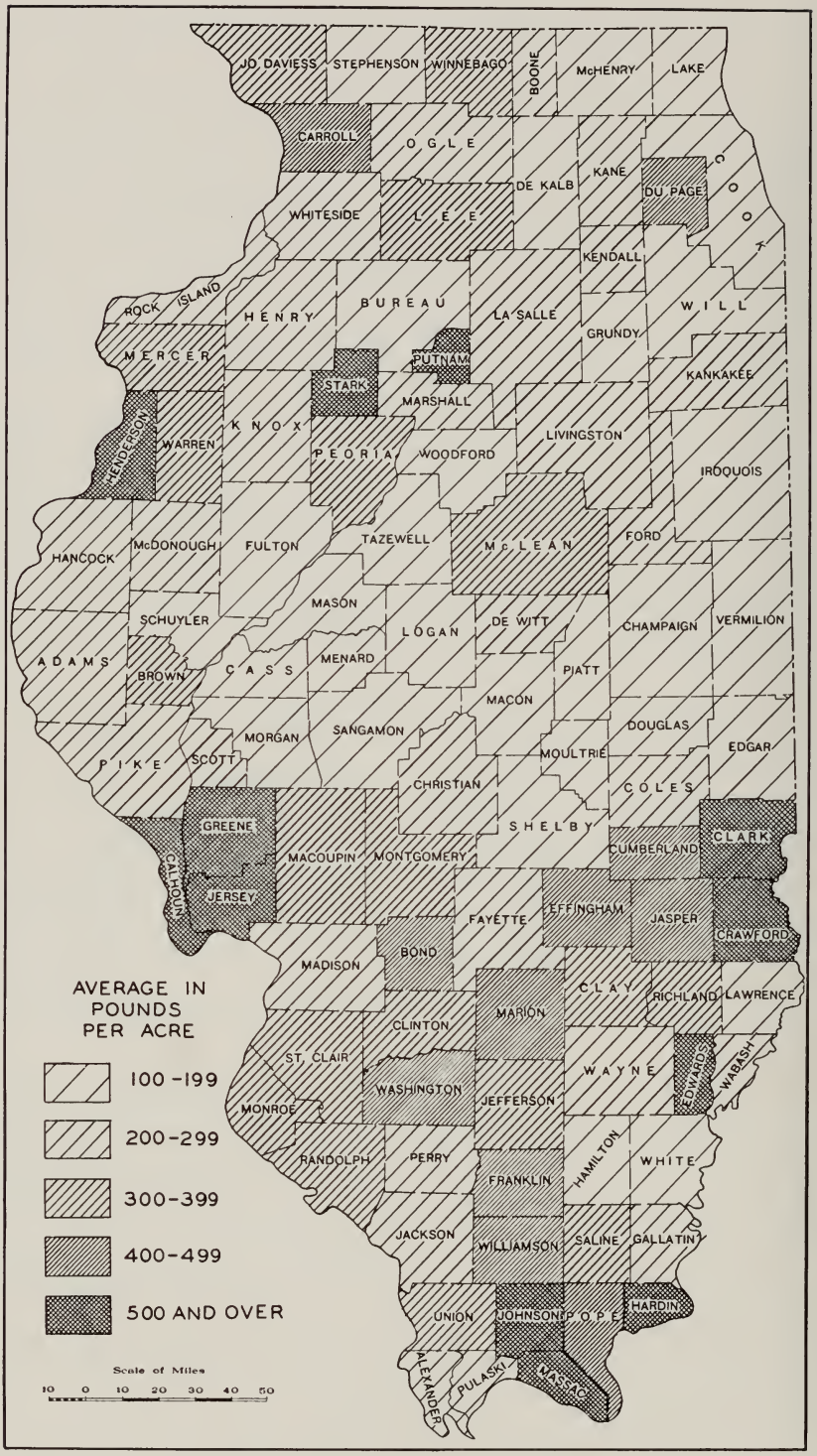

FIG. 8.—Agricultural limestone used in 1941, showing county averages in pounds per acre of arable land.

TABLE 32.—AGRICULTURAL LIMESTONE USED IN ILLINOIS, BY COUNTIES, 1940–1941[a]

County	Tons used in 1941			Tons used in 1940	Acres of arable land (1939 census)	Pounds used per acre[b]	
	Produced in Illinois	Produced in other states	Total			1940	1941
Adams	31,841		31,841	30,335	252,446	236	252
Alexander	6,096	225	6,321	2,345	49,866	96	254
Bond	25,458		25,458	20,123	122,224	304	416
Boone	12,300		12,300	12,268	115,849	210	212
Brown	13,564		13,564	11,253	71,549	288	378
Bureau	25,827		25,827	25,744	352,777	142	147
Calhoun	17,500		17,500	13,473	62,607	390	560
Carroll	33,750		33,750	33,588	151,498	438	446
Cass	12,000		12,000	10,000	137,405	140	170
Champaign	35,124		35,124	33,312	487,052	130	144
Christian	44,184		44,184	35,986	317,469	212	278
Clark	39,629		39,629	37,390	147,721	492	536
Clay	26,563		26,563	26,749	147,932	350	360
Clinton	28,238	7	28,245	28,141	184,463	290	306
Coles	24,788		24,788	21,256	204,186	198	244
Cook	10,000		10,000	9,650	174,178	112	114
Crawford	35,980	2,913	38,893	19,057	129,019	306	604
Cumberland	24,334		24,334	24,013	111,117	400	436
DeKalb	25,700		25,700	26,402	300,180	172	172
DeWitt	18,449		18,449	13,606	178,758	148	206
Douglas	12,822	62	12,884	12,937	203,651	124	126
DuPage	21,486		21,486	7,668	98,841	144	434
Edgar	23,757	1,142	24,899	17,853	255,054	130	196
Edwards	28,614		28,614	16,210	79,811	380	716
Effingham	31,826	3,940	35,766	34,848	153,841	426	464
Fayette	22,366	106	22,472	21,679	207,106	196	216
Ford	23,589		23,589	21,774	235,032	176	200
Franklin	22,565	50	22,615	14,547	101,537	254	446
Fulton	20,087	2,259	22,346	18,802	267,772	130	166
Gallatin	12,000		12,000	6,236	102,638	118	234
Greene	46,432		46,432	25,000	164,814	278	562
Grundy	13,117		13,117	14,161	193,637	140	136
Hamilton	10,225		10,225	12,493	126,415	180	162
Hancock	34,778	249	35,027	31,296	265,043	220	264
Hardin	7,000		7,000	10,618	21,367	726	656
Henderson	34,242		34,242	20,460	127,291	314	536
Henry	39,500	7,194	46,694	30,000	327,034	179	286
Iroquois	34,864	14,661	49,525	45,000	536,438	162	186
Jackson	17,553	2,832	20,385	22,501	147,931	282	276
Jasper	37,705	52	37,757	34,192	174,186	386	432
Jefferson	26,221	105	26,326	32,043	146,453	214	360
Jersey	30,142		30,142	20,520	104,793	354	572
JoDaviess	24,495		24,495	26,420	144,530	360	338
Johnson	23,864		23,864	20,046	59,742	550	800
Kane	21,084		21,084	17,248	210,186	154	200

TABLE 32.—(Continued)

County	Tons used in 1941			Tons used in 1940	Acres of arable land (1939 census)	Pounds used per acre[b]	
	Produced in Illinois	Produced in other states	Total			1940	1941
Kankakee	32,668		32,668	19,604	300,394	126	218
Kendall	18,018		18,018	15,000	150,326	192	240
Knox	22,607	12,044	34,651	26,520	253,753	208	272
Lake	8,080		8,080	8,400	108,847	144	148
LaSalle	58,120		58,120	55,226	506,546	212	228
Lawrence	10,747		10,747	10,300	122,007	174	176
Lee	53,850		53,850	39,779	317,176	248	338
Livingston	63,980		63,980	50,806	522,760	188	240
Logan	20,133		20,133	13,097	305,432	86	132
McDonough	28,626	2,897	31,523	32,831	225,530	280	278
McHenry	15,601		15,601	16,787	211,577	141	147
McLean	83,194		83,194	75,000	557,076	220	300
Macon	18,363		18,363	20,000	263,970	142	138
Macoupin	50,681		50,681	42,124	263,157	288	384
Madison	32,249		32,249	30,075	256,470	224	252
Marion	34,944	7,362	42,306	37,204	171,342	340	492
Marshall	21,782	12	21,794	12,669	158,028	154	274
Mason	14,544		14,544	20,000	225,535	174	128
Massac	17,000		17,000	19,440	56,261	600	604
Menard	12,163		12,163	8,515	128,395	126	188
Mercer	25,258	3,470	28,728	21,742	190,569	226	300
Monroe	23,604		23,604	14,164	144,902	190	324
Montgomery	41,022		41,022	38,000	248,528	280	330
Morgan	8,683	6,642	15,325	16,650	220,259	140	140
Moultrie	11,121	55	11,176	11,000	154,637	134	144
Ogle	39,763		39,763	50,000	309,633	312	256
Peoria	37,508	172	37,680	29,727	203,084	270	370
Perry	17,721	139	17,860	18,496	126,300	266	280
Piatt	16,518	59	16,577	16,000	210,451	144	156
Pike	28,496	120	28,616	35,000	232,460	302	246
Pope	11,307		11,307	9,593	52,202	288	432
Pulaski	7,134		7,134	5,102	53,830	150	264
Putnam	18,293		18,293	10,882	56,148	366	650
Randolph	31,334	3,019	34,353	37,619	196,442	340	348
Richland	20,783		20,783	19,450	132,767	292	312
Rock Island	17,099	1,701	18,800	15,250	127,185	228	294
St. Clair	40,862		40,862	44,794	229,600	334	354
Saline	15,016		15,016	14,000	99,227	232	302
Sangamon	29,422	615	30,037	30,000	358,668	158	168
Schuyler	9,678		9,678	8,938	123,785	136	156
Scott	8,740		8,740	5,112	87,070	113	200
Shelby	24,944	55	24,999	24,297	283,990	162	176
Stark	23,613	10,602	34,215	16,000	121,264	260	564
Stephenson	18,000		18,000	45,000	212,702	426	170
Tazewell	24,901		24,901	15,000	265,832	104	188

TABLE 32.—(Concluded)

County	Tons used in 1941			Tons used in 1940	Acres of arable land (1939 census)	Pounds used per acre[b]	
	Produced in Illinois	Produced in other states	Total			1940	1941
Union	17,892	200	18,092	16,085	94,140	296	384
Vermilion	36,153	492	36,645	40,000	390,901	200	188
Wabash	5,174	2,940	8,114	9,000	80,345	196	202
Warren	33,131	1,133	34,264	33,554	210,953	310	324
Washington	40,815	3,550	44,365	37,338	211,504	320	420
Wayne	30,589	102	30,691	22,197	215,527	212	284
White	11,849	1,841	13,690	14,775	189,016	154	144
Whiteside	34,900	32	34,932	33,000	274,505	234	254
Will	20,477	.....	20,477	20,000	345,147	120	118
Williamson	17,480	175	17,655	15,000	86,222	306	432
Winnebago	30,790	.....	30,790	37,000	180,603	400	342
Woodford	20,436	.....	20,436	18,471	222,776	158	182
Undistributed	410,114	.....	410,114	.....	.....	.....	.....
Total	2,989,629	95,226	3,084,855	2,365,663	20,201,195	Aver. 224	Aver. 306

[a] Canvass by Illinois Geol. Survey, in cooperation with the Midwest Agricultural Limestone Institute.
[b] Computed for 1940 from 1934 Census figures; for 1941 from 1939 Census figures.

TABLE 33.—AGRICULTURAL LIMESTONE PRODUCED IN OTHER STATES AND SOLD IN ILLINOIS, 1935–1941, IN TONS[a]

Year	Amount sold in Illinois	Per cent of total Illinois consumption
1935	54,803	10.5
1936	77,264	7.5
1937	87,479	7.9
1938	118,740	10.2
1939	71,775	5.1
1940	106,912	5.9
1941	95,226	3.1

[a] Canvass by Illinois Geol. Survey.

TABLE 34.—AGRICULTURAL LIMESTONE PRODUCED IN ILLINOIS AND MARKETED IN OTHER STATES, 1935–1941, IN TONS[a]

Year	Indiana	Kentucky	Missouri	Michigan	Tennessee	Total
1935	10,102	32	130	4,135	1,095	15,562
1936	28,976	4,129	587	4,950	6,020	44,398
1937	53,375	12	845	7,522	2,703	64,746
1938	36,356	4	675	1,288	4,100	42,463
1939	3,527	4,735	441	500	18,950	28,169
1940	3,800	5,450	353	325	14,900	25,778[b]
1941	1,800	940	867	65	1,060	4,832[c]

[a] Canvass by Illinois Geol. Survey.
[b] Includes 950 tons to Wisconsin.
[c] Includes 100 tons to Iowa.

TABLE 35.—PRODUCTION AND VALUE OF AGRICULTURAL LIMESTONE IN ILLINOIS, 1939, 1940 AND 1941[a]

	1939		1940		1941	
	Tons	Value	Tons	Value	Tons	Value
Produced and used in Illinois (Table 32)	1,425,683	$1,255,000	2,258,751	$1,910,000	2,989,629	$2,784,960
Produced in Illinois and Marketed in other states (Table 34)	28,169	24,800	25,778	21,700	4,832	4,510
Total produced in Illinois	1,453,852	$1,279,800	2,284,529	$1,931,700	2,994,461	$2,789,470

[a] Canvass by Illinois Geol. Survey.

CEMENT AND LIME

The cement and lime industries of Illinois both felt the greatly increased demand for these materials due to the large amount of construction required for plants to manufacture military equipment and supplies, as well as for military structures, roads, etc.

The sales of cement in Illinois, during the past three years are shown in table 36. During 1941 this amounted to over 6,000,000 barrels, valued at over $8,799,000. This was an increase of 19.7 per cent in value over 1940, and is slightly above the 20-year average.

Production and sale of lime in Illinois during the past three years are shown in table 36. During 1941 this amounted to 246,000 tons, valued at over $1,723,000, which was an increase of 50 per cent in value over 1940, caused by the large increase in both chemical lime and dead-burned dolomite. This represented an increase of 97 per cent in value above the 20-year average. The

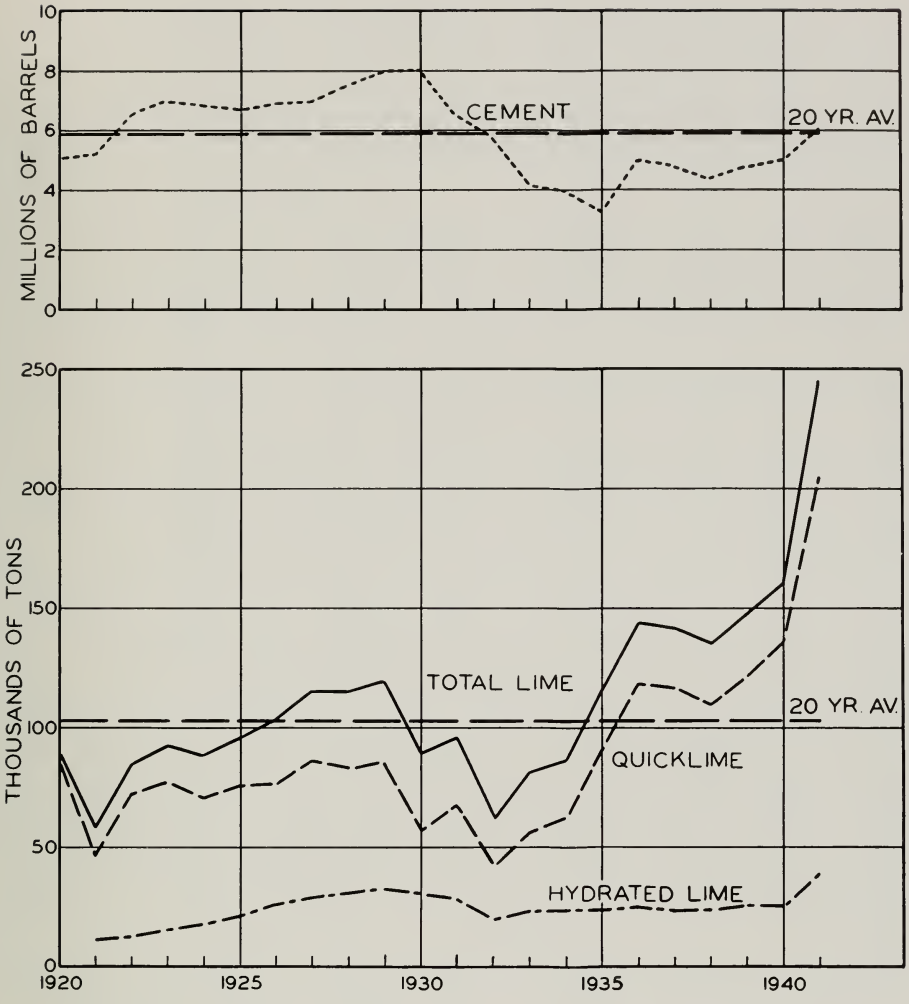

FIG. 9.—Annual shipments of cement and lime by producers in Illinois, 1920-1941.

principal uses of lime in Illinois are also shown in table 36. The fact that these large increases in demand for both cement and lime were met with no increase in average unit prices, is evidence of the stability of these industries.

Trends of production and sale of cement and lime in Illinois, since 1920, are shown in graphic form in figure 9.

TABLE 36.—CEMENT AND LIME SOLD OR USED BY PRODUCERS IN ILLINOIS, 1939–1941[a]

	1939			1940			1941		
	Amount	Value at plant		Amount	Value at plant		Amount	Value at plant	
		Total	Average		Total	Average		Total	Average
Cement[b] (bbls. of 376 lbs.)	4,897,961	$7,226,344	$1.48	5,006,727	$7,347,253	$1.47	6,033,440	$8,799,667	$1.46
Lime:									
Quicklime (tons)	121,312	855,574	7.08	135,266	951,919	7.08	206,578	1,429,855	6.92
Hydrated (tons)	26,417	208,580	7.90	26,092	198,194	7.62	39,700	293,995	7.40
Total lime	147,729	1,064,154	7.23	161,358	1,150,113	7.15	246,278	1,723,850	7.02
By uses (in tons):									
Building	24,840	197,900	7.94	18,819	154,836	8.22	22,378	203,143	9.10
Agriculture	—	—	—	—	—	—	285	2,440	8.56
Chemical lime and dead-burned dolomite	122,889	866,254	7.04	142,539	995,277	6.98	223,615	1,518,267	6.78
Total lime	147,729	1,064,154	7.23	161,358	1,150,113	7.15	246,278	1,723,850	7.02
Total value, cement and lime		$8,290,498			$8,497,366			$10,523,517	

20-year average, 1920-1939, incl.			
Cement[b] (bbls. of 376 lbs.)	5,922,021	$8,671,059	$1.46
Quicklime (tons)	80,638	684,112	8.52
Hydrated lime (tons)	22,736	191,411	8.42
Total lime	103,374	875,523	8.50
Average annual value—cement and lime		$9,546,582	

[a] U. S. Geol. Survey, Mineral Resources; U. S. Bur. Mines, Minerals Yearbooks, and Mineral Market Reports, No. M.M.S. 1012 and 1019.
[b] Includes Portland cement and natural cement.

SAND AND GRAVEL (INCLUDING SILICA SAND)

The sand and gravel industry is one of the oldest and most widely distributed of the mineral industries of Illinois. During 1941 the sand and gravel sold or used by Illinois producers amounted to more than 15,360,000 tons, valued at the pits at more than $8,886,000. Illinois ranked third among the states in quantity, and fifth in value of sand and gravel produced. Details on production in 1939, 1940, and 1941 are given in table 37.

Silica sand.—The silica sand produced in Illinois is derived from the St. Peter sandstone formation, which is a bedrock stratum that crops out at a number of places in the northern part of the State. The silica sand producing industry is centered in the vicinity of Ottawa, where the sandstone is loosely consolidated and therefore readily broken down to sand.

In previous reports on Illinois mineral production, silica sand was grouped with other sands. However, because of the importance of the silica sand industry, separate data are given for it in this report.

During 1941, the production of silica sand amounted to 2,092,000 tons, valued at the plants at more than $2,870 000. This was an increase in value of 59 per cent over that for 1940, and 90 per cent over that for 1939.

Another product of the Illinois silica sand industry is ground silica, also known as ground quartz or silica flour. Data regarding this commodity are given in table 38.

Sand (other than silica sand).—The sand of types other than silica produced in Illinois is almost exclusively, either directly or indirectly, of glacial origin. Much of it is produced as a co-product with gravel, some of it is dredged from rivers and from Lake Michigan, and lesser amounts, especially natural-bonded molding sand, are obtained from dunes or other deposits formed by wind. From these various sources, 104 commercial and 8 government-and-contractor (formerly designated as noncommercial) operations during 1941 produced more than 5,038,000 tons of sand, valued at the pits at more than $2,249,000. This was an increase in value of 54 per cent over that for 1940, and of 92 per cent over that for 1939. More than half of this was used as structural sand, which showed an increase of 74 per cent over that used for similar purposes in 1940, due largely to military and related construction.

The natural-bonded molding sand produced during 1941 was valued at $163,000. This was an increase in value of 104 per cent over that for 1940, and of 170 per cent over that for 1939.

Other uses for sand during 1941 were engine sand and railroad-ballast sand. Both of these groups showed large increases over those for 1940, due to the great increase in railroad transportation caused by military preparations.

Gravel.—Wide-spread deposits of gravel in Illinois, mostly of glacial origin, were the source in 1941 of 8,230,000 tons of gravel, valued at the pits at more than $3,764,000. This tonnage was produced by 118 commercial and 36 government-and-contractor operations. This value was an increase of 46 per cent over that for 1940, and of 55 per cent over that for 1939. Details of production and use are given in table 37.

Total production of sand and gravel (including silica sand) by 149 commercial operations during 1941 amounted to more than 13,790,000 tons, valued at the pits at more than $8,212,000. Also during 1941, 36 government-and-

TABLE 37.—SAND AND GRAVEL
Sold or Used by Producers in

Kind	Type of operation	1939			
		Amount tons	Value at pit		Plants reporting production
			Total	Average	
Silica Sand					
Glass sand[b]	Commercial	470,764	$ 592,738	$1.26	3
Steel molding sand	"	420,674	407,728	.97	7
Structural and paving sand	"	25,085	40,137	1.60	3
Blast, grinding and polishing sand	"	86,686	255,747	2.96	3
Fire and furnace sand	"	32,771	27,914	.85	3
Filter and engine sand	"	9,758	15,308	1.57	3
Other silica sand[c]	"	74,903	179,109	2.39	3
Total silica sand	"	1,120,641	1,518,681	1.35	8
Sand (other than Silica Sand)					
Natural-bonded molding sand	Commercial	65,816	60,227	.92	14
Structural sand[d]	"	1,382,689	548,007	.40	72
" "	Govt.–Contr.	3,884	1,529	.39	4
Paving and highway-structures sand	Commercial	876,807	380,378	.44	46
" " " "	Govt.–Contr.	7,506	1,267	.17	3
Engine sand	Commercial	62,660	26,530	.42	9
Railroad-ballast sand	"	478,739	120,818	.25	6
Other sand	"	48,574	23,252	.48	7
Total sand (other than silica sand)	"	2,915,285	1,159,212	.40	106
" " " " " "	Govt.–Contr.	11,390	2,796	.25	6
" " " " " "	Both	2,926,675	1,162,008	.40	112
Gravel					
Structural gravel[d]	Commercial	1,489,468	726,724	.49	78
" "	Govt.–Contr.	142,240	42,193	.30	7
Paving and highway-structures gravel[c]	Commercial	1,739,703	748,526	.43	91
Paving and highway-structures gravel[c]	Govt.–Contr.	855,227	370,489	.43	33
Railroad-ballast gravel	Commercial	1,369,190	492,037	.36	14
Other gravel	"	125,145	46,786	.37	12
Total gravel	Commercial	4,723,506	2,014,073	.43	129
" "	Govt.–Contr.	997,467	412,682	.41	38
" "	Both	5,720,973	2,426,755	.42	167
Total sand and gravel (including silica sand)	Commercial	8,759,432	4,691,966	.54	162
Total sand and gravel	Govt.–Contr.	1,008,857	415,478	.41	39
Grand total–sand and gravel (incl. silica sand)	Both	9,768,289	$5,107,444	$ .52	201
Total sand and gravel—20 year average (1920–39)	Commercial	12,082,528	$6,364,081	$ .53	

[a] Compiled from joint canvass made by U. S. Bur. Mines and Ill. Geol. Survey.
[b] For melting only.

(Including Silica Sand)
Illinois, 1939, 1940 and 1941[a]

1940				1941			
Amount tons	Value at pit		Plants reporting production	Amount tons	Value at pit		Plants reporting production
	Total	Average			Total	Average	
586,054	$742,959	$1.27	3	754,799	$1,029,217	$1.36	3
474,569	450,525	.95	6	959,254	1,047,468	1.09	7
52,833	77,551	1.47	3	57,519	84,776	1.47	4
98,183	263,534	2.67	3	141,479	438,625	3.11	3
68,104	100,652	1.48	4	56,548	60,956	1.08	3
[f]	—			10,133	28,187	2.78	3
116,344	176,142	1.51	2	112,968	183,732	1.62	2
1,396,087	1,811,363	1.30	7	2,092,700	2,872,961	1.37	7
78,903	79,877	1.01	14	138,973	163,310	1.17	14
1,652,726	716,281	.43	69	2,691,167	1,240,567	.46	68
2,684	506	.19	5	2,638	500	.19	2
1,361,072	517,748	.38	55	1,384,910	554,310	.40	59
14,536	5,343	.37	6	26,846	13,777	.51	6
44,521	22,563	.51	8	78,016	36,974	.47	10
315,055	84,444	.27	6	538,112	168,817	.31	5
48,638	23,638	.49	11	177,370	70,836	.40	14
3,500,915	1,444,551	.41	110	5,008,548	2,234,814	.45	104
17,220	5,849	.34	8	29,484	14,277	.49	8
3,518,135	1,450,400	.41	118	5,038,032	2,249,091	.45	112
1,553,123	825,323	.53	74	2,985,019	1,579,731	.52	66
84,473	40,601	.48	7	12,927	13,170	1.02	3
2,061,883	849,165	.41	79	1,711,802	762,960	.45	85
548,541	213,366	.39	34	1,525,055	646,920	.42	36
1,506,732	608,034	.40	12	1,933,312	734,703	.38	20
84,474	39,873	.47	19	62,132	27,460	.44	15
5,206,212	2,322,395	.45	121	6,692,265	3,104,854	.47	118
633,014	253,967	.40	37	1,537,982	660,090	.43	36
5,839,226	2,576,362	.44	158	8,230,247	3,764,944	.46	154
10,103,214	5,578,309	.55	151	13,793,513	8,212,629	.60	149
650,234	259,816	.40	40	1,567,466	674,367	.43	36
10,753,448	$5,838,125	$ .54	191	15,360,979	$8,886,996	$ .58	185

[c] Excluding sand ground for silica flour, see Table 38.
[d] Excluding highway structures.
[e] This does not include novaculite gravel—see Table 49, "Other minerals."
[f] Included in "Other silica sand" for 1940.

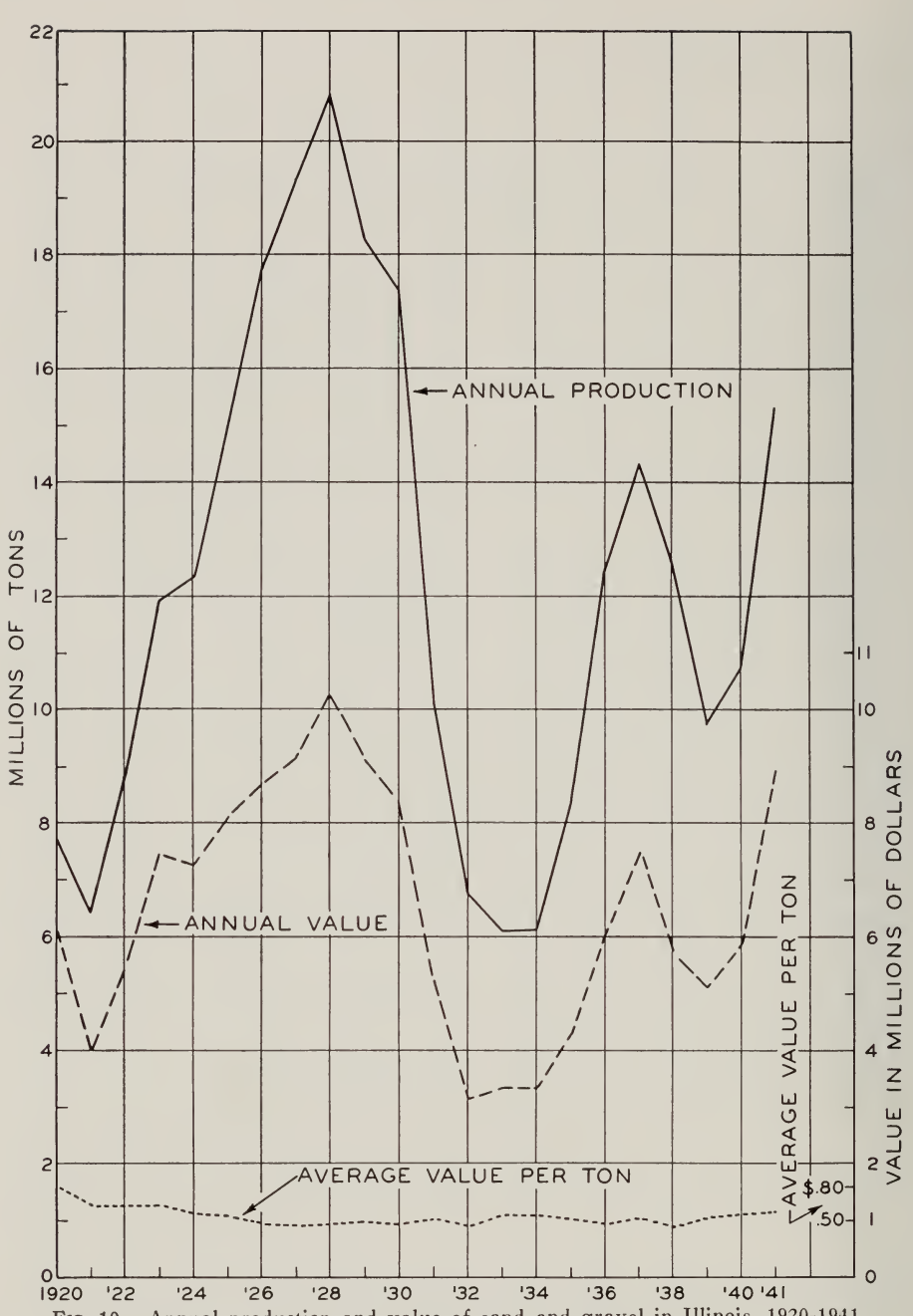

FIG. 10.—Annual production and value of sand and gravel in Illinois, 1920-1941.

contractor operations produced 1,567,000 tons, valued at the pits at more than $674,000. All of these operations produced sand and gravel with a total tonnage of more than 15,360,000 tons, valued at the pits at more than $8,886,000. This was an increase in value of 52 per cent over that for 1940, and of 74 per cent over that for 1939. The 1941 value for commercial operations was 29 per cent above the 20 year average (1920-1939, inclusive).

The figures for government-and-contractor operations for 1939 and 1940 do not include unavailable data on the production of sand and gravel by certain government units. This production is estimated to have been about 1,000,000 tons, valued at about $500,000, for each of those years, and is believed to have been largely gravel. The 1941 statistics include figures on the production of the above government units. If these estimates for 1939 and 1940 are included with the known production figures given in table 37, the adjusted totals indicate that the 1941 value shows an increase of 40 per cent over that for 1940 and of 58 per cent over that for 1939.

Figure 10 presents graphically the annual production and value of sand and gravel in Illinois from 1920 through 1941. This shows the wide fluctuations in this industry, depending upon business conditions. The great increase from 1921 through 1928 was caused by general industrial and construction activity, in addition to which was the state-wide construction of durable highways. Rapid decline from 1929 through 1934 was followed by steady increases from 1935 through 1937. Resumption of some industrial and commercial construction activity, and much public construction activity, caused this increase. Decline followed through 1939 and then rapid increases began, resulting from military preparations. Production for 1941 is the largest since 1930 in volume and since 1929 in value. Development of industrial sands, with their higher unit values as compared with construction sand, has brought the total value for 1941 nearly up to that for 1927 and 1929, and within 14 per cent of the peak for 1928. Average value per ton is also shown for each year.

Ground Silica

Ground silica, or silica flour, is a product made by fine grinding of washed silica sand (see p. 67). The production of this material in Illinois in 1939, 1940, and 1941 is given in table 38. During 1941, the production was 139,000 tons, valued at the plants at more than $849,000. This showed an increase in value of 35 per cent over that for 1940, and of 58 per cent over that for 1939. Illinois ranks first among the states in the value of ground silica produced.

About one-third of the above tonnage was used for abrasives—cleansing and scouring compounds and other abrasives. Another third was used in foundry work and as filler. About one-fourth was used in the ceramic industry, to which the material is known as silica flour or potter's flint. It is also used in the enamel and glass industries.

TABLE 38.—GROUND SILICA
Sold or Used by Producers in Illinois, 1939, 1940 and 1941[a]

Use	1939			1940			1941		
	Amount tons	Value at plant		Amount tons	Value at plant		Amount tons	Value at plant	
		Total	Aver.		Total	Aver.		Total	Aver.
Abrasive	23,507	$148,024	$6.31	35,604	$191,406	$5.37	47,211	$287,274	$6.07
Enamel and glass	7,269	41,289	5.69	9,966	53,838	5.40	4,902	29,218	5.95
Foundry and filler	16,444	101,987	6.18	28,100	174,038	6.20	43,734	266,019	6.10
Pottery, porcelain and tile	22,071	147,361	6.68	23,680	154,272	6.53	32,049	198,143	6.20
Other uses	18,115	99,621	5.50	9,047	54,934	6.08	11,220	68,955	6.12
Total	87,406	$538,282	$6.17	106,397	$628,488	$5.88	139,116	$849,609	$6.10

[a] Compiled from joint canvass made by U. S. Bur. Mines and Illinois Geol. Survey.

TRIPOLI (AMORPHOUS SILICA)

Tripoli (amorphous silica) is found in Alexander and Union counties in southern Illinois and is prepared by fine grinding the raw materials by either wet or dry processes. The production of this material in Illinois in 1939, 1940, and 1941 is given in table 39. During 1941, the production was 13,800 tons, valued at the mills at more than $200,000. This showed an increase of 29 per cent over that for 1940, and of 35 per cent over that for 1939. Illinois ranks first among the states in the value of tripoli (amorphous silica) produced.

This material was used as an abrasive, polish, filler, and for numerous other purposes.

TABLE 39.—TRIPOLI (AMORPHOUS SILICA)
Sold or Used by Producers in Illinois, 1939, 1940 and 1941[a]

Use	1939			1940			1941		
	Amount tons	Value at mill		Amount tons	Value at mill		Amount tons	Value at mill	
		Total	Aver.		Total	Aver.		Total	Aver.
Abrasive	3,100	$41,100	$13.26	3,300	$44,200	$13.40	4,001	$57,893	$14.42
Filler and other uses	8,034	107,210	13.35	8,221	111,376	13.52	9,832	142,807	14.50
Total	11,134	$148,310	$13.32	11,521	$155,576	$13.45	13,833	$200,700	$14.45

[a] Compiled from joint canvass made by U. S. Bur. Mines and Illinois Geol. Survey.

CLAY AND CLAY PRODUCTS

Including Silica Refractories and Fuller's Earth

Clay and clay products (including silica refractories and fuller's earth) are the fourth largest mineral industry in Illinois in value of products, being next to oil and gas, coal, and stone (including cement and lime). The value of clay and clay products made and shipped in 1941, as reported to the Illinois State Geological Survey, amounted to more than $20,295,000. The clay industry is usually separated into four divisions: Clays, structural clay products, white wares and pottery, and refractory products (made from clay and silica).

Figure 11 shows in graphic form the distribution of the various kinds of clays and clay products made and shipped by their producers during 1941, in Illinois, according to their proportionate value. Clays amounted to 3.5 per cent of the total value, structural clay products to 40.5 per cent, white wares and pottery to 32 per cent, and refractory products to 24 per cent.

Production and value, both total amount and average rate per unit, of the various products are presented in table 40 under the four divisions, for 1939, 1940, and 1941. The number of plants reporting production for each kind of material is given, as well as those for each group and for each year. For 1941, reports were received from every producer of clays, white wares and pottery, and refractory products, and from 99 per cent of the producers of structural clay products. This shows the very complete reports for the past year, due to excellent cooperation by the producers with the Illinois State Geological Survey in securing accurate information.

Clays (including fuller's earth), produced and sold during 1941, had a total value of $700,100. Table 40 gives the amount and value, at mine or pit, of clays produced and sold as such. The amount and value of clays which were manufactured into clay products by their producers are not included in the clay section of table 40 but are reported as the finished products. Fireclays constituted 59 per cent by value of all clays sold in 1941, and were used largely for laying and daubing refractories, for bonding foundry sands, and for making ceramic products. Fuller's earth comprised 30 per cent by value and was used for bleaching and filtering of both mineral and vegetable oils, for cleaning compounds, and for fillers and binders. Shales and surface clays made up 6 per cent by value, being used for fillers, binders, and for ceramic purposes. Stoneware clay comprised 3 per cent by value, and was used for the manufacture of stoneware, saggers, and art pottery. Kaolin made up the remaining 2 per cent by value, being used for crucibles, glass pots and enameling.

Structural clay products data, in table 40, show the amount and value at plants of the various kinds of structural material sold and shipped which, during 1941, were valued at $8,248,500. During 1941, common brick sales and shipments were valued at more than $3,787,000, or about 46 per cent of the total value of structural clay products, while face brick amounted to $1,569,000 or 19 per cent. Drain tile were valued at $448,000 or 5 per cent of the total; structural tile at $800,000 or 10 per cent; sewer pipe, wall coping and flue lining at $618,000 or 7.5 per cent; terra cotta and ceramic-glazed and salt-glazed brick and block at $608,000 or 7.5 per cent; and other structural products the remaining 5 per cent. Common and face brick and paving block are given in thousands, the other items in tons. In the totals, equivalent tons are given for all items.

Comparing the structural clay shipments for 1941 with those for the preceding two years, common brick and sewer pipe show notable increases, drain tile, structural tile, and terra cotta continue fairly steady, whereas face brick and paving block show decided decreases. These changes reflect changing demand for these products during the period through which the various industries of our

TABLE 40.—CLAY
(INCLUDING SILICA REFRACTORIES
Sold and Shipped by Producers

Kind	Use	1939	
		Plants reporting production	Amount
Clays			*tons*
Fire clay	Laying and daubing refractories	4	72,736
	Bonding foundry sands	3	17,325
	Making ceramic products[b]	4	23,073
	Other uses	1	150
Total fire clay		9	113,284
Stoneware clay	Stoneware, art pottery, saggers	4	7,831
Kaolin	Crucibles, glass pots, enameling	—	—
Shale and surface clay	Fillers and miscellaneous uses[c]	3	[i] 8,368
		16	129,483
Fuller's earth	Oil bleaching, filtering and miscellaneous uses	1	28,248
Total clays		17	157,731
Clay products			*thous.*
Structural	Common brick	30	213,759
	Face brick	20	128,862
	Paving block	9	7,806
			tons
	Drain tile	15	77,299
	Structural tile	20	129,824
	Sewer pipe, wall coping, flue lining	5	23,861
	Terra cotta and glazed block[d]	3	9,106
	Other structural products[e]	2	37,181
Total structural	(equivalent tons)	50	1,161,071
White wares and pottery	Flowerpots	3	—
	Stoneware and kitchenware	3	—
	Dinnerware and art china	—	—
	Art pottery	3	—
	Vitreous-china plumbing fixtures	4	—
	Porcelain and other whiteware[f]	2	—
Total white wares		10	
Refractory products—Clay and silica	Fire brick and shapes[g]	6	134,890
	Plastic and castable refractories	—	—
	Cements and mortars	3	[i] 815
	Other refractories[h]	2	5,012
Total refractories		6	140,717
Total clay and silica products		75	

[a] Compiled from canvass made by Illinois Geol. Survey.
[b] Includes clays sold for manufacture of fire brick, face brick, sewer pipe, flue lining, wall coping, saggers, art pottery, and stoneware.
[c] Includes clays sold for manufacture of flowerpots, and ceramic-glazed brick.
[d] Includes ceramic-glazed and salt-glazed brick and block.
[e] Includes facing block, light weight aggregate, roofing granules, and grog.
[f] Includes chemical porcelain, electrical porcelain, saggers, clay pipes, garden pottery, modeling clay.

AND CLAY PRODUCTS
AND FULLER'S EARTH)
in Illinois, 1939, 1940 and 1941[a]

1939		1940				1941			
Value at plant		Plants reporting production	Amount	Value at plant		Plants reporting production	Amount	Value at plant	
Total	Aver.			Total	Aver.			Total	Aver.
			tons				*tons*		
$ 137,173	$1.89	6	108,139	$ 190,411	$ 1.76	4	117,685	$ 231,119	$ 1.97
72,992	4.22	3	22,900	90,700	3.95	3	28,798	131,016	4.55
28,887	1.25	3	9,335	15,270	1.64	4	28,600	36,550	1.28
2,800	1.87	—	—	—	—	1	12,000	16,400	1.36
241,852	2.14	9	140,374	296,381	2.11	7	187,083	415,085	2.22
18,430	2.36	3	[i] 5,886	[i] 10,110	1.72	4	13,549	21,834	1.61
—	—	—	—	—	—	3	1,415	14,251	10.10
[i] 13,105	1.57	3	14,406	33,885	2.35	3	20,358	39,355	1.93
273,387	2.12	15	160,666	340,376	2.12	17	222,405	490,525	2.20
218,553	7.74	1	24,974	205,494	8.24	1	26,676	209,577	7.87
491,940	3.12	16	185,640	545,870	2.94	18	249,081	700,102	2.81
			thous.				*thous.*		
2,030,355	9.55	41	260,497	2,605,220	10.00	42	403,338	3,787,863	9.40
2,013,906	15.60	26	121,885	1,802,787	14.81	24	97,541	1,569,395	16.10
182,757	23.30	5	2,053	55,233	26.90	5	2,160	53,024	24.60
			tons				*tons*		
544,422	7.03	21	65,311	426,299	6.53	20	68,060	448,176	6.58
656,746	5.12	27	159,820	820,092	5.14	24	129,464	800,448	6.20
387,727	16.25	4	27,957	466,214	16.70	3	34,806	618,702	17.70
689,512	75.60	3	9,020	603,156	67.00	4	11,027	608,940	55.00
214,386	5.77	4	45,346	272,299	6.01	5	53,305	361,966	6.78
6,719,811	5.79	64	1,272,654	7,051,300	5.55	64	1,556,420	8,248,514	5.32
80,724	—	4	—	175,710	—	4	—	189,597	—
124,106	—	5	—	670,246	—	4	—	1,028,715	—
—	—	3	—	237,824	—	3	—	360,948	—
392,686	—	6	—	755,714	—	8	—	1,596,302	—
[j] 838,620	—	3	—	2,449,307	—	3	—	2,640,406	—
[k] 601,311	—	6	—	676,573	—	7	—	739,504	—
2,037,447	—	19	—	4,965,374	—	20	—	6,555,472	—
2,222,582	16.45	7	175,500	3,301,468	18.82	7	217,247	4,075,282	18.80
—	—	3	7,479	204,092	26.80	4	9,274	312,488	33.70
[l] 57,101	70.20	7	6,062	207,149	34.10	5	3,871	258,507	66.80
48,424	9.63	5	9,302	159,336	17.10	5	13,960	145,022	10.40
$2,328,107	$16.50	12	198,343	$3,872,045	$19.50	12	244,352	$4,791,299	$19.61
$11,577,305		104		$16,434,589		106		$20,295,387	

[g] Includes fire-clay, high alumina, and silica brick and shapes.
[h] Includes retorts, condensers, stove lining, daubing mix, grog, and silica cement.
[i] Includes kaolin.
[j] Includes saggers.
[k] Includes dinnerware.
[l] Includes plastic and castable refractories.

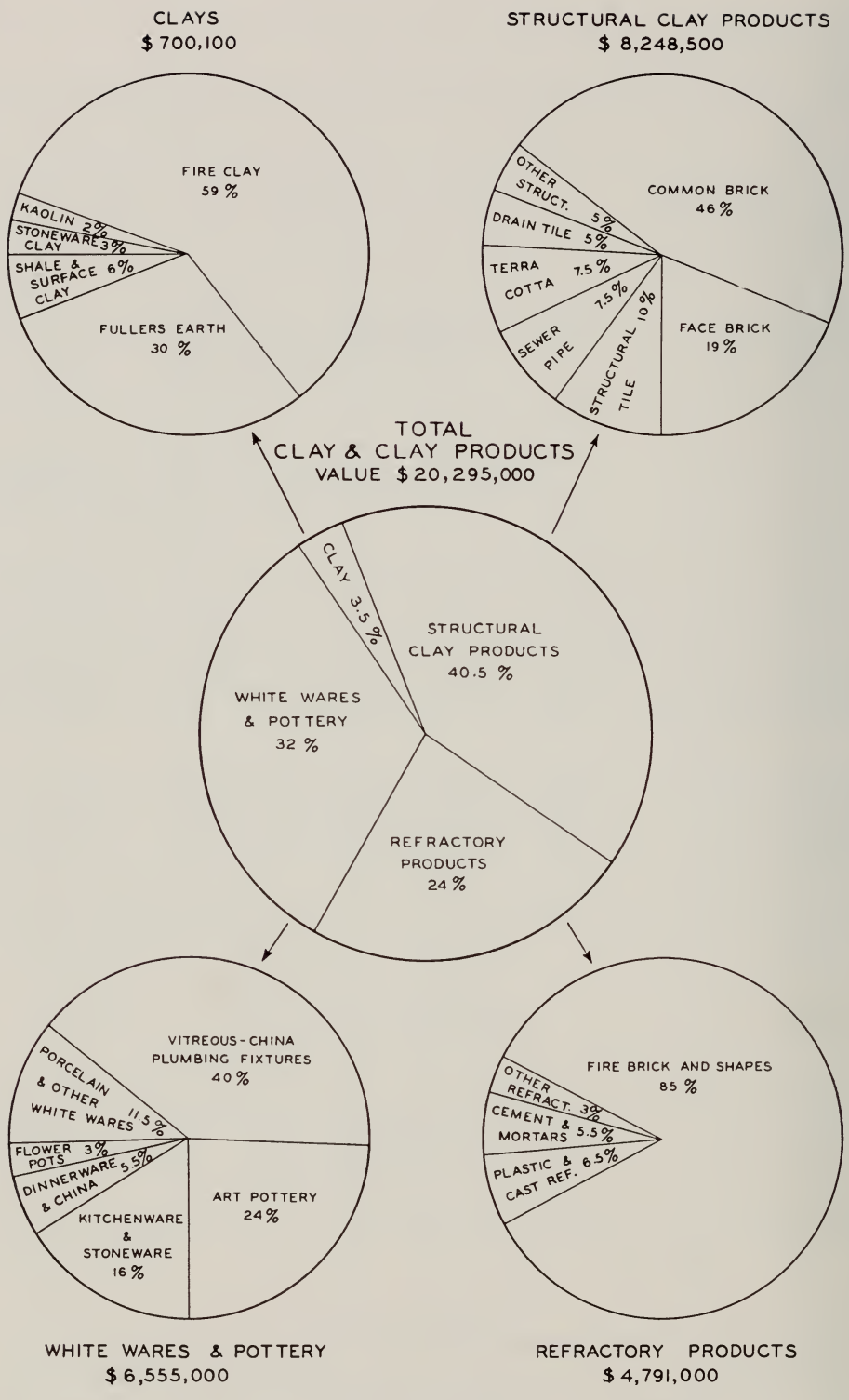

FIG. 11.—Distribution of values of clay and clay products in Illinois, 1941.

country were changing from peace conditions through increasing military preparations to actual war. The construction and enlargement of industrial plants for military production, and the accompanying construction of large housing projects, furnished the increased demand for common brick and sewer pipe and sustained demand for structural tile, while the decline in normal residential and business construction was the cause for the decrease in demand for face brick.

Demand for structural materials, as reflected in value of building permits issued, is shown in table 41 during 1940 and 1941 for each city in Illinois having a population over 25,000, and by groups for the smaller cities and towns. The values of permits are classified for residential and non-residential new construction, and for repairs. During 1941, residential construction increased 38.0 per cent compared with 1940, while non-residential decreased 7.5 per cent, and repairs increased 4.0 per cent. Group housing for workers in plants engaged in military production caused the increases in residential construction. Total permits increased 16.2 per cent over 1940.

Actual military structures erected in the Illinois market area during 1941 were largely of a temporary character, and provided only a slight market for structural clay products except for sewer pipe and drain tile. The large demand for lumber for barracks and other military structures in various parts of our country is gradually producing a shortage of that material which will probably increase the demand for clay products for military uses. The possibilities of salvaging clay products from such structures, when no longer needed, is greatly increased by the use of lime mortar instead of cement mortar in their construction, as recommended by the War Production Board.[2]

White wares and pottery are becoming a very important part of the clay products industries of Illinois. During 1941 the value, at plants, of white wares and pottery produced and shipped in Illinois, amounted to more than $6,555,000. Vitreous-china plumbing fixtures were valued at $2,640,000, or 40 per cent of this total; art pottery amounted to $1,596,000 or 24 per cent; stoneware and kitchenware amounted to $1,029,000 or 16 per cent; dinnerware and art china were $361,000 or 5.5 per cent; flowerpots were $190,000 or 3 per cent; and electrical and chemical porcelain and other white wares amounted to $739,000 or 11.5 per cent of the total. These values show decided increases over 1940 for vitreous-china plumbing fixtures, stoneware and kitchenware, and art pottery. The increase in plumbing fixtures was due to increased demand from group housing, industrial plant and military construction, while the increases in stoneware and art pottery were probably due to changing to clayware for the manufacture of articles formerly made from metals now needed for military purposes.

Refractory products—clay and silica, constitute a division of the clay products industry which is almost entirely geared directly to the war effort. The value, at plants, of refractory products shipped by producers in Illinois during 1941 amounted to $4,791,000 which was an increase of 24 per cent over 1940 and 106 per cent increase over 1939. The value of fire brick and shapes produced in Illinois and shipped by producers during 1941 amounted to $4,075,000 or 85 per cent of the total; plastic and castable refractories were $312,000 or 6.5 per cent; refractory cements and mortars amounted to $259,000 or 5.5 per cent; and other refractories, including retorts and condensers, stove lining and silica cement, amounted to $145,000 or 3 per cent. These items all show large increases over the previous year except the last item which remains about the same. The largest increases were in fire brick and shapes and in plastic and castable refractories, all of which are necessary in the production of iron, steel, and other metals and castings of all kinds that are required in ever increasing quantities for military equipment and supplies.

[2] WPB-1814, Sept. 7, 1942.

TABLE 41.—VALUE OF BUILDING PERMITS ISSUED IN ILLINOIS CITIES, BY CITIES AND BY TYPE, IN 1940 AND 1941[a]

City	Residential		Nonresidential		Repairs		Total	
	1940	1941	1940	1941	1940	1941	1940	1941
Alton	$ 341,471	$ 443,893	$ 312,579	$ 97,630	$ 153,269	$ 197,911	$ 807,319	$ 739,434
Aurora	339,257	599,205	157,297	131,178	298,842	394,199	795,396	1,124,582
Belleville	379,950	709,300	152,425	237,185	104,772	45,898	637,147	992,383
Berwyn	807,450	1,512,750	120,726	97,830	146,755	53,345	1,074,931	1,663,925
Bloomington	425,693	315,024	232,430	326,025	188,464	120,452	846,587	761,501
Chicago	17,822,083	28,423,769	26,852,103	23,007,158	8,443,566	8,778,859	53,117,752	60,209,786
Cicero	313,900	271,350	341,200	1,341,712	133,478	170,164	788,578	1,783,226
Danville	838,889	80,300	239,738	209,000	97,779	177,354	1,176,406	466,654
Decatur	666,120	1,824,374	506,365	229,030	279,885	159,236	1,452,370	2,212,640
East St. Louis	250,800	1,863,317	514,150	167,100	243,414	290,495	1,008,364	2,320,912
Elgin	676,450	787,407	199,105	226,491	285,685	230,648	1,161,240	1,244,546
Evanston	1,211,900	1,246,400	5,386,600	216,500	540,450	600,050	7,138,950	2,062,950
Granite City	726,300	—	59,620	—	592	—	786,512	—
Joliet	511,200	1,681,600	74,168	138,430	356,586	424,818	941,954	2,244,848
Maywood	163,500	231,800	76,735	75,567	96,054	93,787	336,289	401,154
Moline	1,298,604	1,538,978	126,907	558,569	295,406	458,214	1,720,917	2,555,761
Oak Park	373,600	598,400	173,750	76,095	242,185	265,360	789,535	939,855
Peoria	1,433,622	2,316,580	1,054,353	1,199,351	565,228	795,172	3,053,203	4,311,103
Quincy	233,150	1,861,040	46,370	143,410	28,516	33,505	308,036	2,037,955
Rockford	1,184,450	2,263,791	443,525	1,213,400	532,378	662,995	2,160,353	4,140,186
Rock Island	1,721,165	865,274	507,210	148,448	432,524	497,310	2,660,899	1,511,032
Springfield	2,947,327	875,908	184,989	284,676	370,358	330,519	3,502,674	1,491,103
Waukegan	514,250	559,519	73,379	135,408	218,026	272,246	805,655	967,173
Other cities and towns:								
10,000–25,000 population	10,591,785	13,852,695	2,627,861	5,500,250	2,238,517	2,135,266	15,458,163	21,488,211
5,000–10,000	7,748,613	9,629,918	3,068,388	3,088,979	1,266,497	1,124,984	12,083,498	13,843,881
2,500– 5,000	3,667,709	8,394,687	710,356	1,939,660	436,126	549,757	4,814,191	10,884,104
1,000– 2,500	5,593,277	3,892,216	745,130	654,375	331,250	196,006	6,669,657	4,742,597
Total	$62,782,515	$86,639,495	$44,987,459	$41,443,457	$18,326,602	$19,058,550	$126,096,576	$147,141,502
Per cent change from 1940		+38.0		— 7.5		+ 4.0		+16.2

[a] Compiled from U. S. Dept. Labor, Bur. Labor Statistics, Monthly Bulletins, "Building Construction."

FLUORSPAR

The fluorspar industry during 1941 experienced the greatest demand since 1917, due to the unprecedented requirements of steel mills and aluminum plants, both of which made new production records in filling the needs of our military forces. Manufacturers of glass, enamel, and hydrofluoric acid also increased their consumption of fluorspar.

The shipments of fluorspar from Illinois mines, by kind, during the past three years are given in table 42. The shipments for 1941 amounted to more than 133,000 tons, valued at more than $3,047,000. This was an increase of 31 per cent in value over the previous year.

Production of fluorspar by the various states in 1940 and 1941 is given in table 43. Illinois was first in value of fluorspar mined, with Kentucky a close second. The consumption of domestic fluorspar is given by industries in table 44. The steel industry was the largest user, taking more than two-thirds of the entire output.

TABLE 42.—FLUORSPAR SHIPPED FROM ILLINOIS MINES, BY KINDS, 1939, 1940 AND 1941[a]

Kind	1939			1940			1941		
	Short tons	Value at mine		Short tons	Value at mine		Short tons	Value at mine	
		Total	Aver.		Total	Aver.		Total	Aver.
Gravel	57,586	$1,171,678	$20.30	90,864	$1,919,195	$21.15	110,811	$2,416,681	$21.80
Lump	6,330	161,142	25.40	2,277	56,210	24.80	5,743	156,601	27.25
Ground	11,341	305,873	27.10	11,557	338,342	29.30	16,779	473,965	28.20
Total	75,257	$1,638,693	$21.77	104,698	$2,313,747	$22.10	133,333	$3,047,247	$22.85

[a] U. S. Geol. Survey, Mineral Resources; U. S. Bur. Mines, Minerals Yearbooks, Canvass, and Mineral Market Rept. M.M.S. 987.

TABLE 43.—FLUORSPAR SHIPPED FROM MINES IN THE UNITED STATES, BY STATES, 1940–1941[a]

State	1940			1941		
	Short tons	Value		Short tons	Value	
		Total	Average		Total	Average
Colorado	11,032	$ 163,285	$14.80	15,566	$ 225,069	$14.46
Illinois	104,698	2,313,747	22.10	133,333	3,047,247	22.85
Kentucky	103,939	2,043,866	19.66	142,862	2,957,982	20.71
Arizona, New Mexico	7,986	139,675	17.49	19,089	355,951	18.65
Texas						
Nevada	5,803	84,235	14.17	8,967	138,533	14.11
Utah	142			748		
Washington				104		
Total	233,600	$4,744,808	$20.31	320,669	$6,724,782	$20.97

[a] U. S. Bur. Mines, Mineral Market Rept., M.M.S. 987.

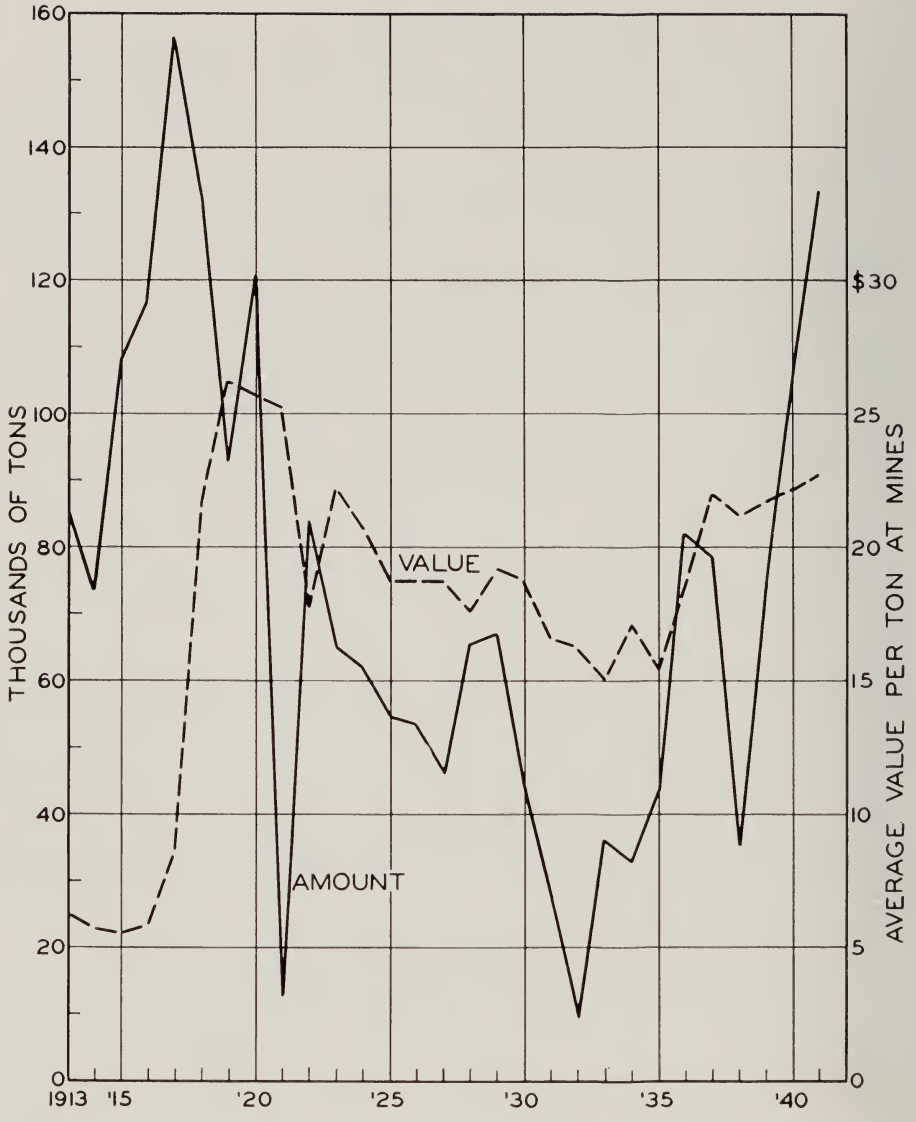

FIG. 12.—Fluorspar, annual shipments and average value, from Illinois mines, 1913-1941.

The importation of fluorspar formerly afforded an important tonnage of this mineral. World conditions restricted this, as shown by table 45, so that during 1941 Mexico and Spain were the only importers of consequence. Consumption of imported fluorspar for the past two years is shown in table 46. Consumption of both domestic and imported fluorspar is given in table 47 by industries, with stocks on hand at the end of the year, for both 1940 and 1941. Stocks on hand at the end of 1941 amounted to about one-third of the previous year's consumption.

So much fluorspar is used in the steel industry, especially in the manufacture of basic open-hearth steel, that major demands for steel in producing munitions and equipment for war have profound effects upon the fluorspar industry. These effects from two world wars are shown graphically in figure 12 which gives total annual shipments and average values per ton from Illinois mines from 1913 to 1941. This indicates that shipments for 1941 were 85 per cent of the maximum tonnage in 1917—156,676 tons.

TABLE 44.—FLUORSPAR SHIPPED FROM MINES IN THE UNITED STATES, BY USES, 1940–1941[a]

Use	1940			1941		
	Short tons	Value		Short tons	Value	
		Total	Average		Total	Average
Steel	162,772	$2,998,054	$18.42	214,120	$4,048,454	$18.91
Foundry	2,829	50,758	17.94	2,724	54,044	19.47
Glass and enamel	20,269	548,069	27.04	32,051	839,547	26.19
Hydrofluoric acid	33,608	852,139	25.36	52,674	1,359,623	25.81
Miscellaneous	5,640	117,321	20.80	6,916	146,332	21.16
	225,118	4,566,341	20.28	308,485	6,447,000	20.90
Exported	8,482	178,467	21.04	12,184	277,782	22.80
	233,600	$4,744,808	$20.31	320,669	$6,724,782	$20.97

[a] U. S. Bur. Mines, Mineral Market Rept., M.M.S. 987.

TABLE 45.—FLUORSPAR IMPORTED INTO THE UNITED STATES, BY COUNTRIES, 1940 AND JANUARY 1—SEPTEMBER 30, 1941[a]

Country	1940		January 1–September 30, 1941[c]	
	Short tons	Value	Short tons	Value
France	5,735	$47,345	.....	.....
Mexico	[b] 1,557	21,466	4,239	$50,295
Newfoundland	3,640	69,825	.....	.....
Spain	112	841	3,070	22,772
Tunisia	829	3,454	.....	.....
United Kingdom	.....	.....	2	32
	[b] 11,873	$142,931	7,311	$73,099

[a] U. S. Bur. Mines, Mineral Market Rept., M.M.S. 987.
[b] Revised figures.
[c] Publication of data after Sept. 30, 1941 suspended, due to war censorship.

TABLE 46.—IMPORTED FLUORSPAR DELIVERED TO CONSUMERS IN THE UNITED STATES, 1940–1941[a]

Use	1940			1941		
	Short tons	Selling price at tidewater, including duty		Short tons	Selling price at tidewater, including duty	
		Total	Average		Total	Average
Steel	9,275	$204,342	$22.03	6,102	$143,863	$23.58
Glass and enamel	11	361	32.82	.....	.....	.....
Hydrofluoric acid	1,634	44,845	27.44	1,418	38,760	27.33
Miscellaneous	4	160	40.00	69	1,380	20.00
	10,924	$249,708	$22.86	7,589	$184,003	$24.25

[a] U. S. Bur. Mines, Mineral Market Rept., M.M.S. 987.

TABLE 47.—FLUORSPAR (DOMESTIC AND FOREIGN) CONSUMED AND IN STOCK IN THE UNITED STATES, BY INDUSTRIES, 1940–1941[a]
(In short tons)

Industry	1940		1941	
	Consumption	Stocks at consumers' plants Dec. 31	Consumption	Stocks at consumers' plants Dec. 31
Basic open-hearth steel	143,800	79,800	191,300	84,200
Electric-furnace steel	11,700	1,700	18,300	2,500
Foundry	2,700	900	2,600	1,000
Ferro-alloys	1,900	900	2,500	1,000
Hydrofluoric acid	[b] 37,000	[b] 13,000	56,000	10,200
Glass and enamel	18,900	4,400	27,600	7,500
Miscellaneous	2,500	1,400	5,300	1,500
	[b]218,500	[b]102,100	303,600	107,900

[a] U. S. Bur. Mines, Mineral Market Rept., M.M.S. 987.
[b] Revised figures.

ZINC, LEAD, AND SILVER

The zinc and lead produced in Illinois in 1941 came from Hardin and Pope counties in southern Illinois, and from Jo Daviess County in northwestern Illinois. In the first two counties, the zinc and lead ores, sphalerite and galena, are found associated with fluorspar, and are mined with it. Illinois production of silver is derived from the southern Illinois galena, which is argentiferous.

The increase in Illinois production of zinc and lead in 1941 resulted from renewed activity in Jo Daviess County and a greater production of fluorspar, and consequently of the associated zinc and lead minerals, also from the coming into production of new fluorspar deposits in Hardin County which are high in zinc and lead, and the erection of a flotation mill at Rosiclare for treating such ores.

Production of zinc, lead, and silver is given in terms of the recovered metals, in table 48, for 1939, 1940, and 1941.

Zinc produced in Illinois during 1941 amounted to 9,198 tons of recovered metal valued at $1,379,700, which showed an increase in value of 127 per cent over that for 1940, and was about 40 times that for 1939.

Lead produced in Illinois during 1941 amounted to 2,376 tons of recovered metal, valued at $270,864. This showed an increase in value of 79 per cent over that for 1940, and was more than 9 times that for 1939.

Silver produced in Illinois during 1941 amounted to 20,340 fine ounces (Troy weight) of recovered metal, valued at $14,464. This showed an increase in value of more than 4 times that for 1940, and was more than 31 times that for 1939.

The total production of these three metals in Illinois during 1941 was valued at $1,665,028.

TABLE 48.—ZINC, LEAD AND SILVER MINED IN ILLINOIS IN 1939, 1940 AND 1941, IN TERMS OF RECOVERED METALS[a]

Metal	1939			1940			1941		
	Amount	Value[b]	Average	Amount	Value	Average	Amount	Value	Average
Zinc	334 tons	$34,736	$104.	4,818 tons	$607,068	$126.	9,198 tons	$1,379,700	$150.
Lead	308 tons	28,952	94.	1,508 tons	150,800	100.	2,376 tons	270,864	114.
Silver	675 fine ounces	458	0.68	4,766 fine ounces	3,389	0.71	20,340 fine ounces	14,464	0.71
Total value		$64,146			$761,257			$1,665,028	

[a] U. S. Bur. Mines, Minerals Yearbooks.
[b] Value for zinc and lead based on yearly average price received by producers, as determined by U. S. Bur. Mines. Value for silver based on U. S. Treasury buying price.

OTHER MINERALS

Included in this group are several mineral materials produced in Illinois by less than three producers for each material, so that details of production cannot be published without revealing individual operations. These materials are:

Ganister, a siliceous material found in Union and Alexander Counties, of southern Illinois;

Novaculite Gravel, a chert gravel resulting from the disintegration of a bedrock chert formation in Alexander and Union Counties, and used for road construction;

Peat, produced in northern Mason County for mixed fertilizer and other purposes (Illinois ranks second among the States in the production of peat);

Pyrites (coal brasses), produced in Henry County from coal-cleaning operations, where 13,400 short tons of pyrites were sold in 1941;

Sandstone, and *miscellaneous stone*, produced in various parts of the State for rip-rap and road work, which during 1941 amounted to 4,100 tons valued at $5,900—produced by government-contractor operations.

The total amount and value of these mineral materials just described, which were produced in Illinois in 1939, 1940, and 1941, are given in table 49. These totals show a considerable reduction in 1941 from each of the two preceding years, due to a large reduction in the amount of sandstone and miscellaneous stone produced. This was caused by extensive curtailment of road work. Production of the other mineral materials in this group generally showed continuing increases through 1940 and 1941.

TABLE 49.—OTHER MINERALS[a] SOLD OR USED BY PRODUCERS IN ILLINOIS IN 1939, 1940 AND 1941[b]

Year	Amount tons	Value
1939	278,764	$354,862
1940	279,724	242,526
1941	137,053	171,177

[a] Minerals included:—ganister, novaculite gravel, peat, pyrites, sandstone, miscellaneous stone.
[b] Compiled from joint canvass made by U. S. Bur. Mines and Illinois Geol. Survey.

TABLE 50.—MINERALS PROCESSED, BUT NOT MINED, IN ILLINOIS, SOLD OR USED BY PRODUCERS IN ILLINOIS IN 1939, 1940 AND 1941[a]

Kind	1939			1940			1941		
	Amount tons	Value	Average	Amount tons	Value	Average	Amount tons	Value	Average
Coke (byproduct)[b]	1,884,240	$11,963,932	$6.35	3,014,840	$18,217,939	$ 6.04	3,660,878	$25,214,769	$6.89
Coke breeze	196,337	485,913	2.47	253,055	577,525	2.27	326,085	782,171	2.40
Byproducts	—	6,279,000	—	—	8,156,000	—	[c] —	7,658,000	—
	—	18,728,845	—	—	26,951,464	—	—	33,654,940	—
Packaged fuel[d]	3,998	40,487	10.10	3,813	36,531	9.60	8,924	95,431	10.60
Iron, pig	3,203,846	57,718,814	18.02	4,093,623	73,882,065	18.05	5,461,459	113,558,606	20.79
Sulfuric acid[e]	178,144	1,605,077	9.00	188,355	1,721,565	9.15	[f] —	—	—
Zinc, slab, from Illinois ore[g]	334	34,736	104.00	4,818	607,068	126.00	9,198	1,379,700	150.00
From other ore	79,146	8,231,184	104.00	97,001	12,222,126	126.00	112,723	16,908,450	150.00
Total zinc	79,480	8,265,920	104.00	101,819	12,829,194	126.00	121,921	18,288,150	150.00
Total processed, but not mined, in Illinois		$86,324,407			$114,813,751			$164,217,427	

[a] Compiled from U. S. Bur. Mines, Minerals Yearbooks, and Mineral Market Report, M.M.S. 1004 (Slab Zinc).
[b] See table 20—Production of coke and byproducts.
[c] Figures for some byproducts not available, due to war censorship.
[d] See table 19—Production of packaged fuel.
[e] 60° Baumé—from zinc smelting.
[f] Not available, due to war censorship.
[g] Value for zinc based on yearly average price received by producers, as determined by U. S. Bur. Mines. Figures for zinc smelted from Illinois ore are not included in "Total processed" in this table—see table 48.

MINERALS PROCESSED, BUT NOT MINED, IN ILLINOIS

Included in this group are mineral materials which are processed in Illinois, but are mined in other states. The production of these materials in Illinois in 1939, 1940, and 1941 is given in table 50.

Coke and byproducts.—All coke produced in Illinois is made in byproduct ovens. The coal used to produce this coke amounted to 5,163,463 tons in 1941, of which 236,251 tons, or 4.6 per cent of the whole, were mined in Illinois, and the balance came from six other states, mostly in the eastern bituminous field. The coke produced from Illinois coal is not differentiated from the other, so table 50 gives the entire amount of coke made in Illinois. In 1941 this was 3,660,000 tons, valued at the plants at over $25,214,000. There was also produced 326,000 tons of coke breeze, valued at $782,000, and various byproducts valued at about $7,658,000. Details of coke manufacture are given in this report in the section on "Coke" (see p. 47). The total value of coke and byproducts produced in Illinois during 1941 (not including some byproducts on which figures are not available, due to war censorship) was $33,655,000. This total value showed an increase of 25 per cent over that for 1940, and an increase of 80 per cent over that for 1939. This tremendous increase was due to military preparations which greatly stimulated all metal industries.

Packaged fuel is processed in Illinois from the fines resulting from storage and handling of eastern coal. In 1941 the packaged fuel produced was 8,900 tons, valued at $95,400. This was 2½ times the value of that produced the previous year. Data cannot be published on the production of *fuel briquets* in Illinois without revealing individual operations (see p. 45).

Pig iron is produced in Illinois from iron ore mined in the Lake Superior district. During 1941 there was produced 5,461,400 tons of pig iron, valued at the furnaces at more than $113,558,000. This was an increase in value of 54 per cent over that for 1940 and of 97 per cent over than for 1939. This great increase was the result of military preparations.

Sulfuric acid is produced in Illinois as a byproduct of the smelting of zinc ores. During 1940, production amounted to 188,000 tons of acid at 60° Baumé valued at $1,721,000. Data for 1941 are not available, due to war censorship.

Slab zinc is made in Illinois from zinc ore mined in Illinois and in other states. Table 50 gives the total production of slab zinc made in Illinois from ores from all sources, that smelted from ore mined in Illinois (see table 48), and that from other ore. The slab zinc smelted in Illinois in 1941 from ores from all sources amounted to 121,900 tons, valued at $18,288,000. This showed an increase in value of 42 per cent over that for 1940, and was more than 2 1/5 times that for 1939.

Ground feldspar is made in Illinois from crude feldspar which is mined in South Dakota. It is used in the manufacture of whiteware and enamels and for other purposes. Data cannot be published on feldspar grinding in Illinois without revealing individual operations.

Pig lead is made in Illinois by smelting lead ores; that obtained from ores mined in Illinois is given in table 48. Data on pig lead produced in Illinois from ores mined in other states are not available.

Mineral wool is made in Illinois from blast furnace slag and from natural rock materials. Data on production in Illinois are not available.

Expanded vermiculite is produced in Illinois by heat-treating crude vermiculite which is mined in the west. Production figures are not available.

Alumina, phosphates, and other processed mineral materials are produced in Illinois in large amounts, but data for them are not available.

The total value of mineral materials which were processed in Illinois, but mined in other states, during 1941 amounted to $164,217,000. This was an increase of 43 per cent over 1940, and of 90 per cent over 1939.